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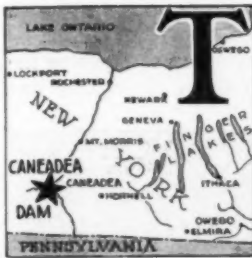
## Plant Layout at the Caneadea Dam

By Herbert W. Reutershan and F. H. Eastman

Resident Engineer

Construction Manager

Gannett, Seelye & Fleming, Harrisburg, Pa.



THE first of April witnessed the completion of the Caneadea Dam by Gannett, Seelye & Fleming, Engineers, Inc., general contractors, for the Caneadea Power Corp., a subsidiary to the Rochester Gas & Electric Corp., Rochester, N. Y.

The specific purpose of the new dam is to control the flow of the Genesee River for the power plants of the Rochester Gas & Electric Corp. in Rochester, until the storage dam in the Genesee River Gorge at Mount Morris is built, and with that work under way to help control the water in the river in time of freshets. Located strategically near the mouth of the Caneadea Creek, the dam will regulate the flow of water from the creek into the river.

Towering 140 feet above the surface of the creek, the dam will flood 800 acres, making a lake 2 miles long and  $1\frac{1}{2}$  miles wide at the widest point. It will have a drainage area of 60 square miles. The structure is of the "constant angle arch type," and is the only dam of its kind in the East, though the dam in the Great Smoky Creek in North Carolina resembles it in some particulars.

Measured along a radius of 262.5 feet, the arch dam is

440 feet long with the thrust carried at the north and south ends by two gravity abutments 100 feet and 80 feet long, respectively. The base of the arch section at the widest point is 44 feet thick with the width diminishing gradually to 5 feet at the top, where it broadens out to form a 10-foot walk-way and to provide for a track to the central gate house.



Excavation on the South Side (Right) Hauled by Hand Dump Cars Filled from the Hopper and Later Piled Without Hauling by Derrick No. 3

This dam is founded on good hard rock throughout, and its foundation and cutoff wall go down 20 to 40 feet below the surface and back into the hillsides, and every foot of the foundation has been thoroughly grouted with high pressure grout 30 to 100 feet below the bottom of the foundation to stop all the seams and crevices and to keep the water from passing through underneath.

This job was built about 3 miles from the nearest railroad or town, so that we had to build a little town of our own to house the 300 or 400 men who were employed on it. There were offices for engineers and our own forces of accountants, clerks, etc. There was a general company store where clothes, food, tobacco and almost anything else could be bought. There was a commissary run by our own organization, where everyone was fed three times a day, and then there were bunk houses in which the employees had bunks or individual rooms in which to sleep.

All these men were necessary, notwithstanding the fact that nearly \$100,000 worth of labor-saving machinery was installed and used throughout the job. The construction plant was made up of steel guy der-



General Layout of the Caneadea Dam Construction Plant, Showing the Method of Handling Concrete and Materials to the Belt Conveyor and in the Background to the Right, the Construction Field Office, Camp Building and Dining Hall



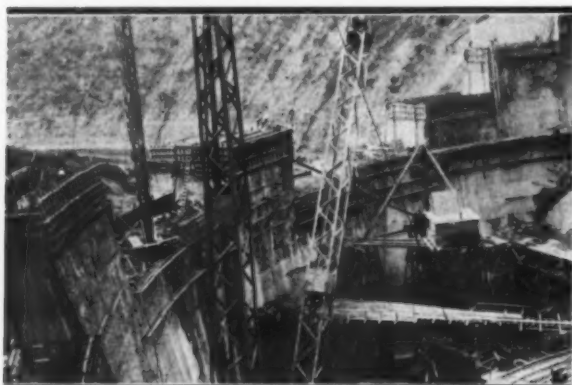
*The Lower End of the Retarding Belt Conveyor of the Canaedeia Dam Which Carried Aggregates to the Mixing Plant in the Gorge*

ricks for hoisting the rock from foundations and placing the concrete, steel stiff-leg derricks and clamshell bucket with belt conveyors for handling the concrete materials, batch mixers with inundators for mixing the concrete, and gasoline locomotives, with cars and buckets for transporting it from the mixing plant to the derricks. A central compressor station furnished air for the rock excavation, drilling, grouting and other purposes. All the equipment, including the pumps, was electrically operated except the gasoline donkeys.

#### PLANT LAYOUT

The excavation was begun in December, 1926. Working on this excavation through the Winter, the coming of Spring found the spillway location ready for concrete work, and upon its completion served as an excellent storage location for aggregates used in constructing the dam proper. This plan of work and the placing of the aggregates in the spillway is not to be passed without comment. Not only did this location prove excellent for storage, but when confronted with the elements of the following Winter, the work to be completed was all concentrated in a few sections of the dam in close proximity to the boiler plant.

The location of the sand and gravel storage having been determined, it was next necessary to decide on the best means and methods of moving the aggregates to the mixing plant in the gorge. Adjacent to the storage piles a 60-foot boom, Insley stiff-leg derrick was set up. This



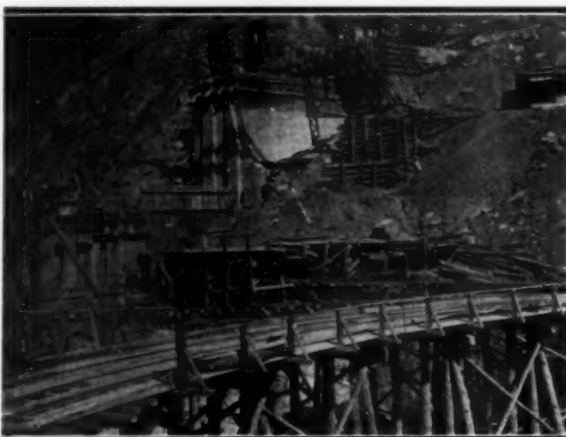
*The Wooden Stiff-Leg Derrick on 24-Foot Bents from Which Position It Poured Concrete to Elevation 1390*

derrick transferred the material to two Blaw-Knox 30-ton feeding bins. The bins were fitted with shaker gates, which allowed the materials to drop on an 18-inch retarding belt conveyor, carrying the aggregates to the mixing plant in the gorge.

#### MATERIAL HANDLING

Along with the problem of handling aggregates was that of cement and brick for armor, both of which had to be shipped and hauled to location from the railroad siding constructed by the contractor at the village of Canaedeia 3 miles from the site. The unloading and hauling was ordinary but the means of moving the material into the 200-foot gorge was the most involved of the problems, from the standpoint of cost and practicability, to be solved.

The first step in the process was the construction of a road down the steep embankment to the spillway level. The road was cut in triple zig-zag fashion with small plateaus at each intersection of the zig-zag to permit trucks to turn before moving up or down to the next higher or lower level. A grade of 10 per cent was



*The Main Double Track Curved Trestle from the Mixing Plant to the South Bank. Single Tracks Extended Toward the Center and Along the North Bank Toward Derrick No. 2*

required to make the top in three moves. At the lower end of this road a bridge was built across the 48-foot spillway cut which led to a plateau built up from material taken from the spillway cut.

#### CEMENT CHUTED TO MIXING PLANT

Cement hauled to this plateau was stored in the upper shed or moved through the shed on roller conveyors to a covered gravity chute carrying it down 80 feet to the level of the mixing plant. Here it was stored in the lower shed or moved direct to the mixers on roller conveyors and deposited by hand in the mixer hoppers. Brick trucked to the same level was moved to a 100-foot lower level in a gravity chute similar to the cement, stored or loaded in skips and hauled on cars to the various trestles and placed by derricks in the sections as needed.

#### SAND AND GRAVEL PLANT

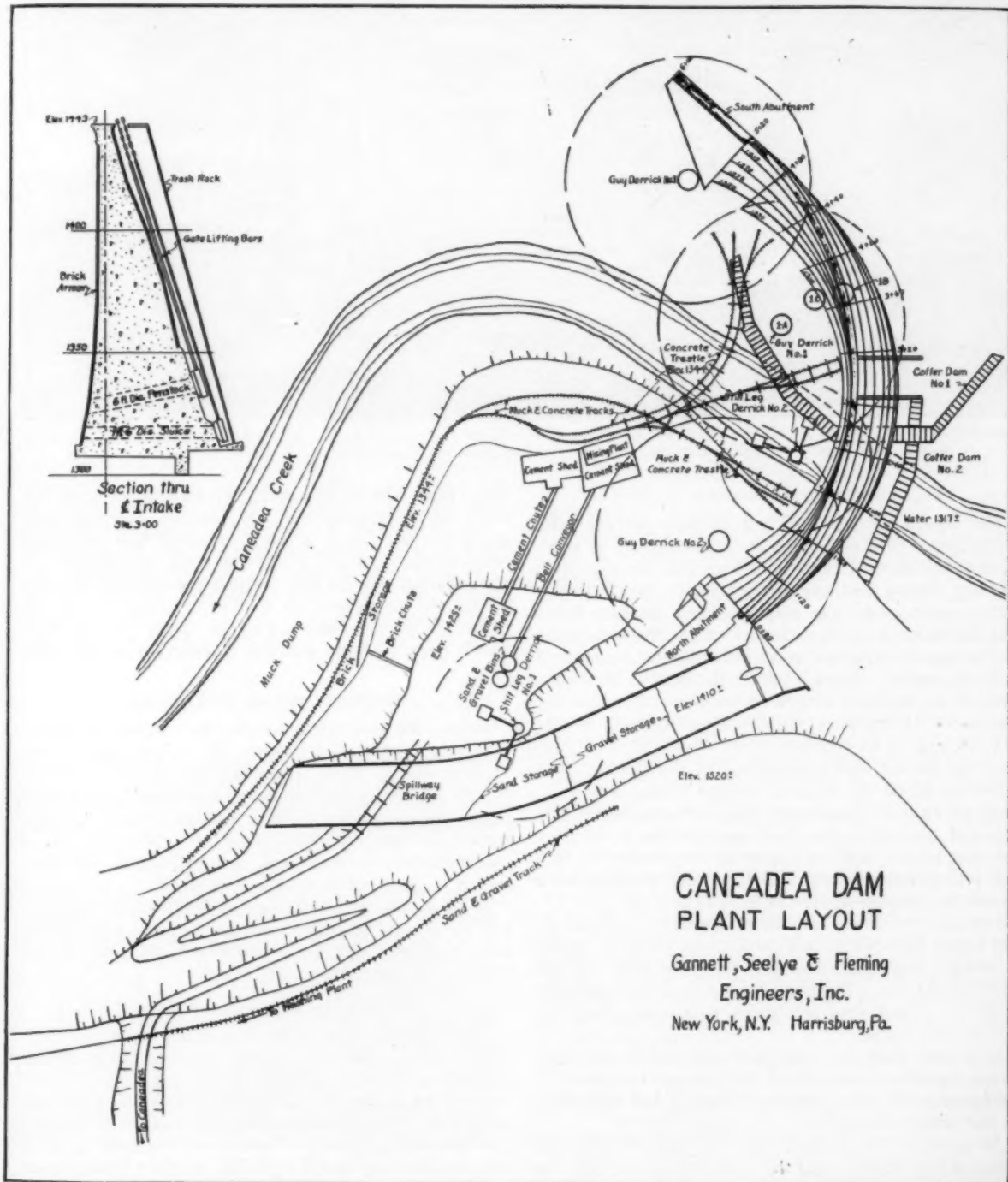
All the sand and gravel for the job was produced at the location  $\frac{1}{4}$ -mile from the dam site. Two complete washing units were set up and operated by two 10-hour shifts daily. One moveable unit was fed by a

75-foot boom stiff-leg derrick; for the second and stationary unit, an Erie gas + air shovel, with trucks for hauling the unwashed material thereto, was employed. Gasoline and steam dinkies operating on a narrow gage track with 4-yard Western dump cars were used to haul the washed sand and gravel from the washing plant to the cliff above the spillway into which it was dumped for storage.

### QUANTITIES

The construction entailed the excavation of 28,000

cubic yards of earth and 47,000 cubic yards of rock; the placing of 66,000 cubic yards of concrete; the laying of 575,000 brick on both the up and down stream faces as an armor; the drilling of 4,000 feet of diamond drill holes for grouting in addition to 4,320 feet for grouting in re-inforcing dowels in the north abutment. Two 54-inch diameter sluices and two 72-inch penstocks were placed, together with gates and hoisting mechanism, manufactured by Phillips and Davies of Kenton, Ohio, who also furnished the two 20- x 21-foot spillway gates.







*Handling Sand and Gravel for Concreting at the Canadea Dam. At the Extreme Right Is a White Line Next to the Stairs. This Is the Covered Way for Chuting Cement Sacks by Gravity from the Upper Shed to the Main Storage Shed Below*

#### CONCRETE PLACING

The contractor was required to place all concrete, which meant that no towers and chutes could be used. To accomplish this, three American guy derricks with 100-foot booms and one 60-foot boom wood stiff-leg derrick were used. The accompanying diagram shows best the location of these derricks from the standpoint of placing the concrete in addition to the removal of rock excavation. Derrick No. 1, the first to be set up, removed all material excavated south of cofferdam No. 1 to Block 11, inclusive, and placed concrete in Blocks 8, 9, 10, and 11 to elevation 1380. From its first position, the derrick was later moved to the down stream corner of Block 10, where it poured Blocks 8 and 11, while an 18-foot square rock-filled crib was being built adjacent and tied to the dam opposite Block 10. This crib was 60 feet high and upon its completion the derrick was moved thereon and from this position completed the pouring of Blocks 8, 9, 10 and 11.

Derrick No. 2 was set up at elevation 1385 or 60 feet higher than No. 1, and commanded Blocks 3, 4, and 5, besides assisting materially with the work on the north abutment. Material hauled into the spillway could be moved into the gorge with ease after this derrick was set up.

At a later date the boom was extended to 133 feet, giving complete command of Block 6 and by means of a hopper and buggies completed Block 7, left unfinished by the wood stiff-leg.

As soon as the concrete had been poured over the penstocks in Block 8, and the water turned through the

sluice pipes, the wood stiff-leg derrick was set up in the creek bed. Together with Derrick No. 2, which commanded a portion of Block 5, material was excavated from Blocks 5, 6 and 7 and the work of placing concrete started. In its first position the stiff-leg was able to pour to elevation 1355 in Blocks 6 and 7. At this point the derrick was placed on bents 24 feet high which permitted the pouring of concrete to elevation 1390.

#### CONSTRUCTION OF COFFERDAMS

Before the excavation for the foundation of Blocks 8 to 11 was started, cofferdam No. 1 was constructed. It measures 12 x 12 feet, built up of 10- x 12-inch timber, rock filled. When the concrete had been poured above the penstocks in these sections, the water was turned through the sluice pipes and cofferdam No. 2 constructed across the creek bed, permitting the excavation to go ahead in sections 5, 6 and 7.

Derrick No. 3, set up on the south bank opposite, and at the same elevation as No. 2, commanded all the excavation and placing of concrete in sections 12 and 13 and the south abutment.

#### DISPOSAL OF EXCAVATED MATERIAL

With the exception of a small space along the down stream south bank of the gorge, all excavated material had to be hauled  $\frac{1}{4}$ -mile from the site down stream. A complete system of inter-connecting narrow gage railroad with various trestles was constructed to remove the excavated material. The system was built to serve this purpose and later for placing concrete within reach



of the various derricks. The main double track curved trestle ran from the mixing plant to the south bank with single tracks toward the center and along the north bank toward derrick No. 2. The excavation on the south side was hauled along that side by means of hand dump cars and later piled up without hauling by derrick No. 3.

#### INUNDATION USED

The inundation system of mixing concrete was used excepting the spillway walls and a portion of the north abutment where the ordinary wheelbarrow,  $\frac{1}{2}$ -yard mixers, and tower with chutes were employed. At the main mixing plant in the gorge, two complete sets of Blaw-Knox 150-ton bins with sand inundators and gravel batchers were placed, with each set feeding a Smith 1-yard electric-drive mixer. The first illustration shows the set-up of the plant with the cement shed adjoining and the belt conveyor above which were placed the aggregates in the bins.

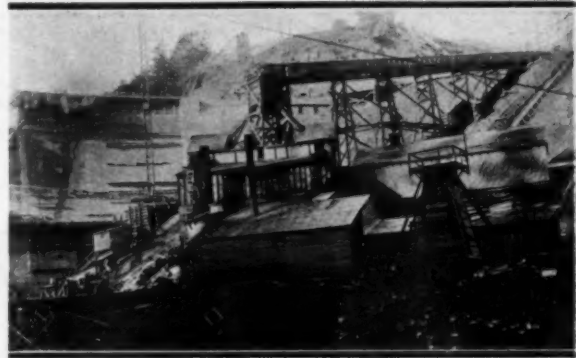
The equipment used for hauling concrete is as follows: three Vulcan 4-ton gasoline-driven locomotives; eight Easton 4 x 6-foot flat cars on which were set eight Stuebner 1-yard dump buckets. Each locomotive was required to haul two cars with buckets.

#### WINTER CONSTRUCTION

Early last fall preparations were made to install all the necessary equipment to permit the continuance of the work throughout the winter months uninterrupted. A battery of four boilers was set up adjoining the mixing plant, one of which was used for heating water for concrete, two for steam and one reserve steam. The entire plant was housed in and around the mixing plant to insure comfortable and safe working conditions for those employed at the plant. Covered steam lines were run to each section of the dam and to insure the safety of each pour of concrete against freezing, three or four coils were placed around the block and the entire section covered with tarpaulins. The concrete was placed at a temperature of not less than 80 degrees and not more than 125 degrees Fahrenheit.

#### COSTS

The job cost about \$1,500,000, and a great deal of this cost was due to the fact that in order to make it



*Steam Boilers Installed Adjoining the Concrete Mixing Plant for Winter Construction*

safe, the engineers insisted on our excavating well below the bottom of the creek to get a solid rock foundation and into the hillsides to reach the solid and secure rock upon which to have the ends of the dam abut. The concrete specifications required a minimum of 1.2 barrels of cement per cubic yard.

#### PERSONNEL

The personnel on this project was E. R. Crofts, Chief Engineer for the Rochester Gas & Electric Corp., with Arthur Whitbeck as Resident Engineer for the owner in immediate charge. Our own representative on the job was E. M. Kayser, Superintendent, with W. K. Ward, Assistant Superintendent, and Herbert W. Reutershan, Resident Engineer.

#### Uniform Mechanics' Lien Act Revised

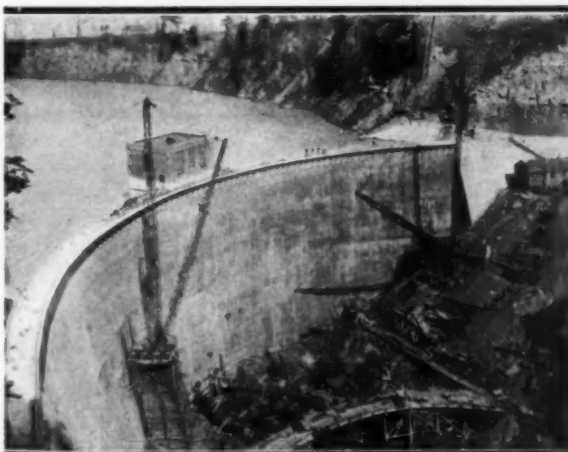
**A** TENTATIVE revision of Section 5 and 6 of the second draft of the Uniform Mechanics' Lien Act, has been adopted by the Standard State Mechanics' Lien Act Committee, according to an announcement of the Department of Commerce.

The amendment to Section 5 provides that an owner of property who has contracted for its improvement shall retain from the contractor 10 per cent of all money as it becomes due instead of requiring the contractor to give the owner at the time of each progress payment a sworn statement showing his outstanding obligations as was contemplated in previous drafts of the section. The contractor would still be required, however, to submit such a sworn statement before receiving the final payment and the amounts retained by the owner.

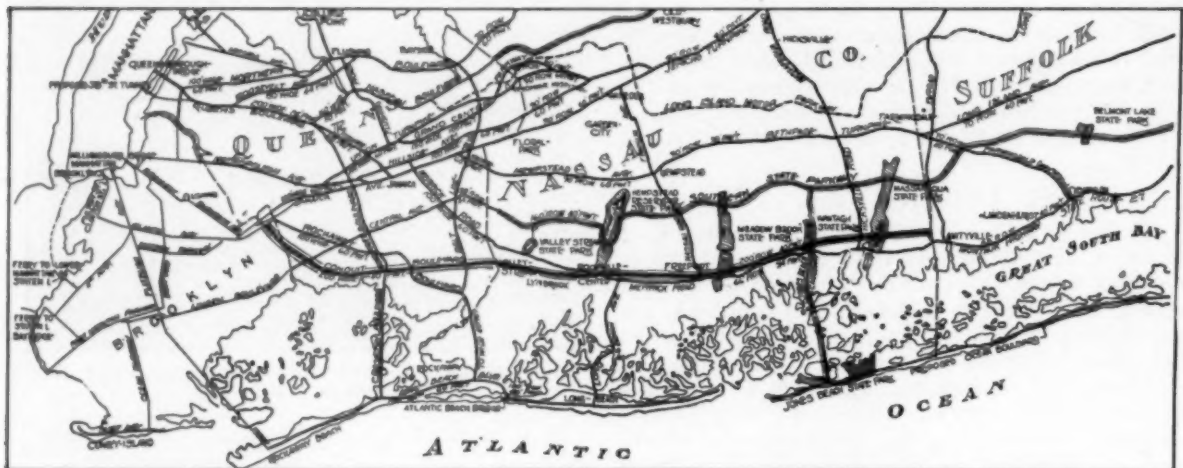
Minor amendments have been made in Section 6 to conform with those in Section 5.

Under mechanics' lien acts, which are in force in all states, the claims of laborers, materialmen, subcontractors, contractors and others who contribute to the improvement of property are secured by the property improved which, under stated circumstances, may be sold to satisfy these claims when payment is not made by the person from whom it is due. Because of complaints that some existing laws are not equitable and that the differences in present laws cause expense and inconvenience to persons doing business in more than one state and to laborers moving from one state to another, this committee was appointed some time ago by Secretary Hoover at the request of interested groups.

The members of the committee are representatives of the principal groups engaged in the construction industries including the American Federation of Labor. The National Conference of Commissioners on Uniform State Laws, which is a body composed of official delegates from each state and which is interested in all uniform state legislation is cooperating in this work through a committee appointed for the purpose.



*The Complete Canadea Dam in April, 1928, Looking Across the Dam from the South Bank, Showing the Downstream Face*

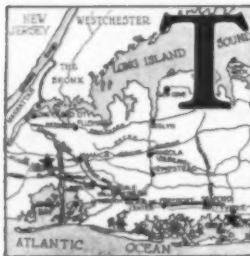


Map of the Southern End of Long Island, New York, Showing the Location of Conduit Boulevard

# Paving Conduit Boulevard, Long Island, N. Y.

By James A. Flinn

Assistant Engineer, New York State Highway Department



**T**HE Conduit Boulevard on Long Island is the largest highway project under construction in the State of New York. It is unique in a number of ways. Starting at Atlantic Avenue at the Ridgewood Pumping Station in the Borough of Brooklyn, it follows the 72-inch steel conduit of the Department of Water Supply south easterly to Aqueduct and thence easterly through Queens and Nassau to the Nassau-Suffolk County line at Amityville. The distance is 24 miles. A new route from Brooklyn on the south shore of Long Island that does not pass through Jamaica is thus made available. The widening of Force Tube Avenue from Atlantic Avenue to Jamaica Avenue will connect this route with the end of Highland Boulevard generally known as Snake Hill. Liberty Avenue, Woodhaven Boulevard, Rockaway Boulevard, and the new Linden Boulevard cross this route. The more important of the cross-island boulevards will pass either under or over the Conduit Boulevard. In Nassau County, the famous Merrick Road crosses the Conduit at Rockville Center. Four branches of the Long Island Railroad cross this new Boulevard, at Aqueduct, at Laurelton, at Valley Stream, and at Lynbrook. Plans for the elimination of these railway grade crossings are now being discussed. The underpass of the Conduit Boulevard under the Cross Bay Boulevard, the overpass over Rockaway Boulevard, and the pass over the Long Island Railroad at Aqueduct will be in separate contracts. These are the first highway grade separations that New York State has ever planned.

## THE AQUEDUCT

The City of New York had acquired a right-of-way 200 feet in width from Brooklyn to Amityville and constructed a steel pipe 72 inches in diameter for water service. This pipe was covered with 3 feet of earth about 10 feet in width at the top. As the Long Island Railroad abuts on the north side of the 200-foot strip the pipe line was placed as close to the south side of the right-of-way acquired as the topographical conditions would permit. The ground water level on this section of Long Island is generally less than 5 feet from the surface. This condition, as well as a desire to keep the necessary excavation to a minimum, finally resulted in a dike 10 feet wide at the top and about 5 feet above the existing land, except where village streets were utilized as part of the line, for the greater part of the 24 miles. This route is admirable for a traffic artery. The maximum grade is 2 per cent but for the greater part of the distance it is under one per cent. The south

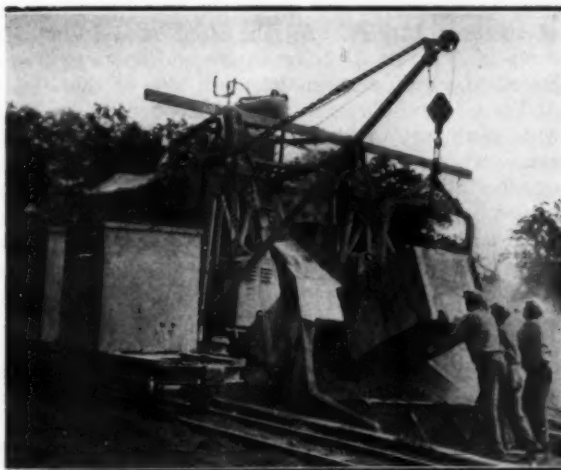


Stone Bins at Flushing Dock, Showing Floating Crane Handling Stone from Barges

side is privately owned but the north side, for two-thirds of the way, is the Montauk Division of the Long Island Railroad. The other third is a city street in Queens County. Cross streets, except in the center of villages, are few and far between. There is small chance of the railroad consenting to new streets being opened. A fast traffic highway is thus assured.

#### GRADING OPERATIONS

The construction of this project has been divided into a grading and a paving operation. The grading in Nassau County was started in July, 1925, and completed in December, 1926. It was practically a borrow contract. The grade of the existing water-main dike was kept and widened to a width of 52 feet. Culverts and bridges were lengthened to the necessary distance. From Rosedale to Valley Stream the fill was made by truck from spoil obtained from building excavations. From Valley Stream to Rockville Center the fill was placed by truck hauled from the abandoned Millburn Reservoir halfway between Rockville Center and Bald-



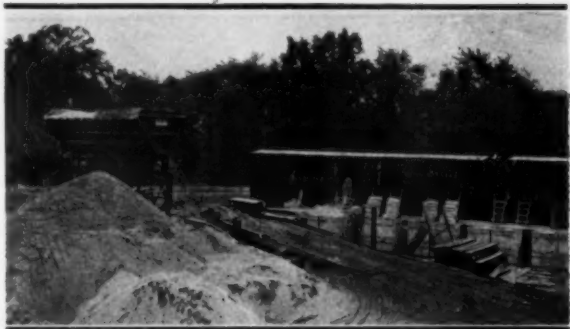
*Method of Handling Batch Box from Industrial Railway to Skip on Conduit Boulevard*

win. From Rockville Center to Seaford the fill was made by a 3-foot narrow gage railroad with 12-ton gas locomotives and 5-yard dump cars. Fill was hauled from the Millburn reservoir. From Seaford to Amityville the fill was hauled by truck from a borrow pit near Seaford. Five-ton trucks of several makes were used. One hundred and eighty-five thousand cubic yards of embankment were placed by truck and 200,000 cubic yards of embankment were placed by railroad, making a total of 385,000 cubic yards in Nassau County.

In Queens and Kings Counties, New York City,  $2\frac{1}{2}$  miles on each end of the 8-mile section were filled from trucks and the material was obtained from building operations of many kinds.

#### FILL WITH DREDGED SAND

The center section was a most interesting operation. The fill was generally 20 feet high because of the need for head room for sewers. This ground is in some places below tide water. The embankment was made from sand dredged from Jamaica Bay and carried by gas locomotives and 5-yard dump cars from the edge of the Bay, one mile, to the line of the Conduit and thence



*The Valley Stream, L. I., Proportioning Plant No. 1, Showing Cement Being Dumped into Batch Boxes. Note That the Hand Trucks Are Spotted for Each Batch Box*

east or west to the end of the fill. The dredge was electrically operated. At first, an attempt was made to pump from the dredge to the loading bins. It was found to be impossible to drain the water from the sand in the bins. Sand, dry on top and bottom, would contain water in the middle and when reached would bury a train before it could be checked. Even when loaded in the cars the damp sand was so fluid that a large amount would leak out of the cars before the dump was reached. This same sand that had leaked from the cars banked along the track and caused a number of derailments.

This method was abandoned and two compartments, each large enough for a stock pile for a 12-hour run, were built alongside the loading bin. Each compartment was pumped full and then allowed to drain for the necessary time. A portable crane with a 1-yard clamshell moved the sand from the compartment to the loading bin. This dry material was handled without any difficulty. The City of New York would not permit pumping direct to the embankment because of the chance that the salt water might enter the conduit water supply. This part of the work was a 24-hour job even though the dredge did not work to capacity. The dredge placed 500,000 cubic yards, and 350,000 cubic yards were placed by truck. The total embankment placed was 850,000 cubic yards. This contract was let in September, 1925, and was completed before the end



*Proportioning Plant No. 1, at Valley Stream, L. I., Showing the Stock Piles of Sand and Stone and the Wooden Bin on the Steel Frame. The Truck Dumping from the Right Is on a Ramp*





*Finishing Machine Strike-Off Set for Depth of Reinforcement*

of 1927. Plans for the pavement have been completed and a contract was let this Spring.

#### PAVING IN NASSAU COUNTY

The 16-mile contract for the pavement in Nassau County was let in June, 1927, and about 11 miles were completed in 1927, and the entire contract will be completed by July, 1928. The pavement is 9 inches in thickness, and placed in four 10-foot lanes, making 40 feet of reinforced concrete pavement. Between the 10-foot lanes is placed a  $\frac{1}{2}$ -inch premoulded expansion joint. Transverse expansion joints are placed every 78 feet. The longitudinal expansion joint is placed to provide for the change in vertical diameter of the 72-inch steel pipe due to change in pressure. A normal pressure is maintained in the line just sufficient to overcome the friction head. After any repairs are made to the pipe, a test pressure of 70 pounds is applied. This pressure has caused a distinct crack in the earth fill over the pipe. The black expansion strip will also serve as a traffic guide. The 78-foot panel length is in accordance with the trend to long panels, but less than 100 feet. Bar mats of  $\frac{1}{4}$ -inch square bars are assembled in the field for reinforcement. A 1:2:3½ concrete mix is used. Local sand and Hudson River limestone is used for aggregate. Water is obtained from local ponds. Hay is used for a cover while the pavement is curing.

Excavation and grading was a minor detail in the pavement contract. All of the heavy grading had been done in 1925 and 1926. The village streets in the route

had not been disturbed. All of the grading was done by a grader pushing the earth to be excavated into windrows that were picked up by a small shovel. The concrete pavement encountered in the cross roads was excavated from time to time as work was in progress at each particular street. Traffic was maintained on all existing roads. Small trucks, from 1 to 3 yards capacity, and equipped with pneumatic tires, were used in this part of the work.

#### MATERIAL HANDLING

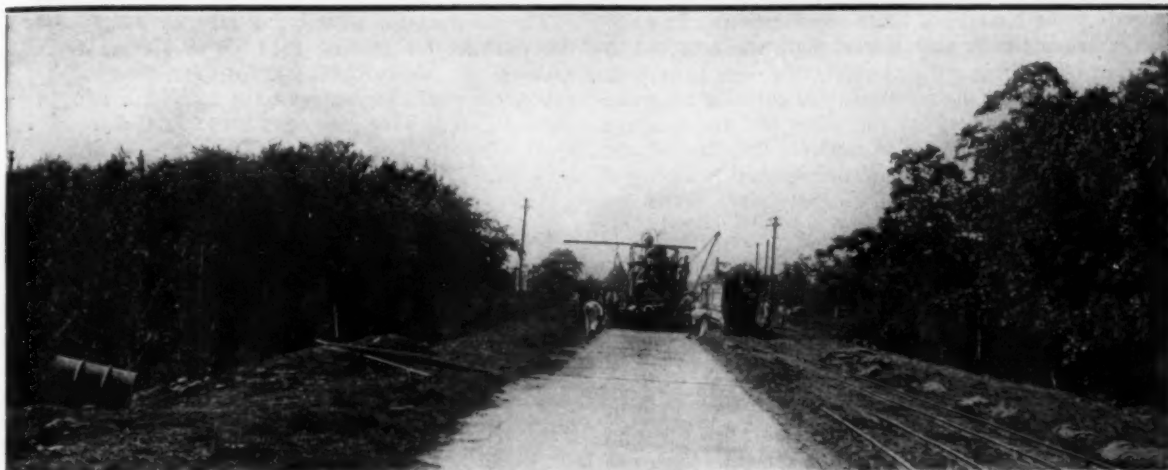
The big problem in the project was in the delivery of the material for concrete pavement on a schedule in unison with the amount used by the pavers. Three 27-E pavers were in daily use from the beginning of operations and later a fourth paver of the same capacity was added. Also a small 7S mixer was used in paving intersections. Water delivery of materials on the south shore of Long Island is not used because of the shallow channels, lack of proper docks, and high rate of insurance and towage. The island is not more than 15 miles wide and the north shore has a number of excellent harbors. All the stone used is brought down the Hudson River on barges and up Long Island Sound to some point on the north side of the Island. At Long Island City the railroad has a dock equipped with machinery to transfer stone to railroad cars. At every other point truck haul is the only method of transportation. Stone was unloaded at Flushing and hauled by truck for the westerly 8 miles of the Conduit Boulevard paving, and for the easterly 8 miles, stone is being transferred from barges to cars at the railroad dock at Long Island City.

At the Flushing dock of Emmet Simpson, other hoppers were erected and in addition to the electric crane, with a 1-yard bucket, a floating steam-operated crane with a 2-yard bucket was in daily use. Stone was carried in a fleet of 25 trucks from this dock 13 miles to Valley Stream and later the 17 miles to Rockville Center to the proportioning plants at those sites. Trucks averaged over 130 miles a day. At the plant at Merrick, stone is delivered by the railroad on a siding alongside the proportioning plant. Sand is obtained from local developed pits. Because of the recent real estate boom, there is very little land that can be acquired for less than \$1,000 an acre. Consequently, the purchase and development of a pit for this contract is out of all reason. On account of the large number of pits con-



*An Intersection Being Paved in Rockville Center. The Tangent Is Shown Being Paved by a Second Mixer*





*The Completed Pavement on Conduit Boulevard, Showing Two Lanes Completed and Covered with Hay and One Lane Being Laid. The Industrial Railway Track Is Laid on Earth Cover on the Concrete*

taining acceptable sand a very small number of trucks were able to keep an adequate supply at each plant. A description of the sand pits would be interesting but would show nothing new. At one place the sand was loaded from the excavation directly to the trucks as it was free from any gravel. At one large plant the source of supply was dredged from a small river and passed through a set of screens and bins. At still another the sand was taken from an open pit and washed through the screens and bins. Only dry sand was loaded from the trucks to the proportioning bins and the washed or dredged sand was loaded to a stock pile. In that way the water content of the sand was kept within a close limit and a consistent water ratio in the concrete was obtained.

Cement was shipped by railroad to a side track at each plant. It was loaded from the car to the batch box.

#### PAVING AT WEST END OF CONTRACT

The westerly eight miles, from Freeport west to Rosedale, were laid by a narrow gage using a train of 12 cars, each carrying two batch boxes with a 7-bag batch, and hauled by an 8-ton gas locomotive. The Rockaway Branch of the Long Island Railroad at Valley Stream and the Long Beach Branch at Lynbrook determined the location of the proportioning plants rather than the economical haul. At Valley Stream a plant was erected at each side of the railroad crossing. The plant on the East covered the section between the two railroad crossings. The plant at the West covered the section from the beginning of the contract to the railroad crossing. A plant that served two mixers was later erected at the east end of Rockville Center. One mixer went from the railroad crossing at Lynbrook to the plant and the other went from the plant to Freeport. Each mixer made four trips, one for each 10-foot lane, but left a gap at all of the street crossings to permit traffic.

Material was unloaded from the trucks at the proportioning plants by backing the truck up a steep ramp and dumping over the end of the ramps into pits large enough to hold about 25 cubic yards. Whenever the trucks bunched, as in the early morning, they could

all dump without waiting for the crane to clear the pit. This material, sand or stone, was moved by a clamshell on a crane with crawler traction to either the stock pile or to the proportioning bin. This was a steel frame with wooden sides and four adjustable measuring boxes. The narrow gage track ran under the bins. Two batch boxes were loaded at a time and then the next car of boxes spotted.

The train was then run to the cement platform. Lines had been painted on the cement platform so that when two batch boxes had been spotted then the entire train was spotted. On the platform at these marks, hand trucks with the seven bags of cement were placed. After the arrival of the train, it took only a moment to dump the hand trucks on top of the sand in the batch boxes. The bags were emptied upon the arrival of the train at the mixer. A crane attached to the mixer raised the batch box from the train and emptied it into the mixer skip. The mixer was equipped with water control, time lock, and boom and bucket discharge as re-



*Batch Box Being Lifted from Truck. Note the Longitudinal Expansion Joint Being Placed. The Wave on the Edge of the Pavement Is on Angle Irons Placed Over the Joints to Permit Mortar Being Placed Behind the Joints*

quired by the New York State specifications. In addition, a heavy timber with a steel plate was attached to the rear of the mixer to act as cutting edge to remove any high spots in the subgrade. A portable subgrade tester was always between the mixer and the concrete that was being placed. The concrete was first struck off to a grade 2 inches below the finished grade by a hinged steel plate on the finishing machine. Then the fabricated steel mat was placed and the added concrete finished by the machine with the hinged plate turned up. The usual hand finishing brooming, tooling the edges, covering with hay, and sprinkling for ten days, kept ten men busy at each mixer.

The truck haul of batches to the paver did not vary greatly from the operation of the narrow gage railroad. Two batch boxes were placed on each truck. Cement was placed in the bottom of the box and then the sand and stone were placed on top of the cement. This was done because the sand roadway at the cement platform could not be compacted enough to hold a loaded truck. Also emptying cement bags on a truck with only two batches did not allow time enough for the cement handlers at the mixer. The batch boxes were lifted from the trucks as from the train and all other operations were the same, except that on the train section alternate 10-foot lanes were poured to avoid moving track. On the truck section, the adjoining lanes were poured.

The pavement was opened to traffic as soon as all of the four 10-foot lanes were 21 days old. Trimming along the shoulders was done by a  $\frac{1}{2}$ -yard clamshell with an independent gas-engine power plant, mounted on a 5-ton motor truck. It was a new idea in this part of the world and proved to be a very efficient machine for this kind of work.

#### PAVING INTERSECTIONS

The number of street intersections in the contract divided into the total mileage is not unusually large. But in place of being evenly distributed over the entire contract most of the street crossings to be repaved are bunched in the villages. At one place, four intersections occur within 1,000 feet. At another, 700 feet of an intersecting 30-foot road had to be repaved. In these special cases, a 27-E mixer fed by trucks with two compartments was used. At one of these places, the 27-E mixer was paving a 10-foot lane at the same location as the truck-supplied 27-E mixer was paving the intersecting street. The daily yardage of the intersection paver was low but the contractor felt that the constant routine of the crew on the pavers working on the 10-foot lanes should not be disturbed by special work. A 7S mixer was used on the isolated road intersections outside the main parts of the villages. The output of the small mixer was satisfactory.

#### ORGANIZATION

The grading contract in Nassau County was completed by the Arthur A. Johnson Corporation of Long Island City. In Kings and Queens Counties the grading was done by Paladino Engineering Corporation. The paving in Nassau County is being placed by Johnson, Drake and Piper of Minneapolis, Minn.

J. S. Bixby at Poughkeepsie is the District Engineer, C. A. Huhne at Babylon is the Resident Engineer, and J. A. Flinn at Freeport is the Assistant Engineer in charge.

The contract for paving amounts to \$1,400,000 and the contract for grading \$563,000 in Nassau County, making only about \$2,000,000 for the 16 miles.

The engineer's estimate for the 8 miles in Kings and Queens Counties for grading is \$974,000, and for paving is \$1,200,000. This does not include the bridges to be built.

#### An Unusual Accident

A 10-TON, 95-foot steel latticed derrick fell 22 stories from the building under construction at 41st and 42nd Streets and Lexington Avenue, New York, on the afternoon of Thursday, May 3, damaging a portion of an adjacent building and not harming a single workman on the building, nor passing pedestrian. This structure, the Chanin Building, is to be 56 stories high and the iron workers had just completed the framework of the twenty-second floor when the derrick fell directly over the center of 41st Street, swerving and striking the girders on the seventeenth and eighteenth floors. From there it was deflected to the south side of the street, and struck the 4-story building at 126 East 41st Street, tearing away a portion of the top floor.

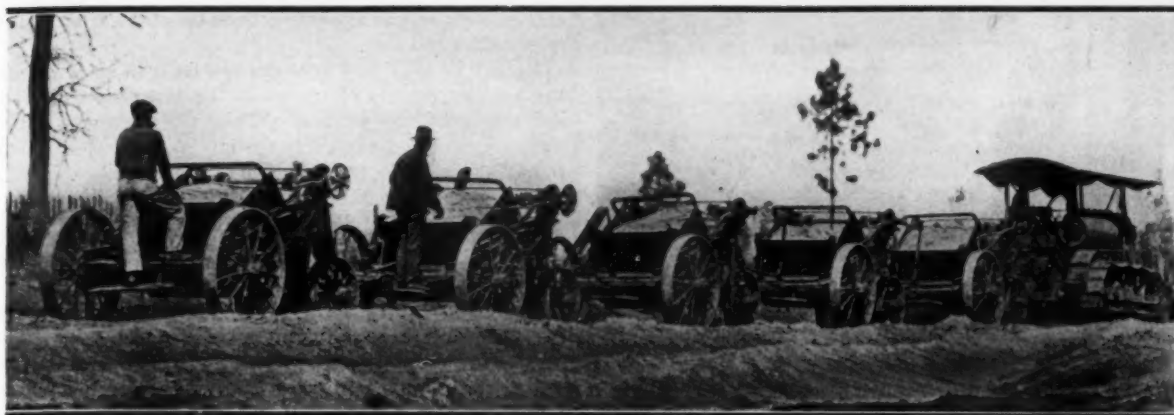
The impact caused the latticed steel of the derrick to crumple. One end clattered to the street, landing squarely between two parked sedans, followed a second later by the other end which struck the rear end of a truck parked in front of a sign reading, "Danger—No Parking." The 95-foot length of twisted derrick lay across the street, one end of it propped against the 4-story building and the other resting on what was the end of the truck.

Considering that this district is one of the most congested in New York City, it is remarkable that such an accident should have occurred without loss of life.



International Newsreel Photo

A Portion of the Derrick Soon After the Crash



*A Caterpillar Sixty and Five Baker-Maney Scrapers Building a Highway in Colquitt County, Ga.*

## The Science of Dirt Moving

By F. A. Nikirk

*Former Superintendent of Streets, San Jose, Calif.*



**I**N planning a layout for a job involving earth moving, it is well always to consider the four sub-divisions of the subject, namely, 1, Loosening; 2, Loading; 3, Transporting, and 4, Placing. In some cases the loosening and loading of earth is performed in one operation, as with elevating graders or steam shovels.

Sometimes the loading and transporting of earth is performed by the same piece of equipment, as is the case with various kinds of scrapers. Under the heading of "Placing" is also included the spreading and compacting of the material.

### LOOSENING

The loosening is generally performed by plows, either of the moldboard type or the roter type, and the kind of plows used will depend very largely upon the nature of the soil moved and the amount of pulverizing necessary to reduce the material to the proper condition for loading. There being no universally adopted classification of soils, and there being such a gradual gradation from the light sand or loam to the toughest of hardpan, it is difficult to give any general rules for the adoption of specific types of plows.

### LOADING

Loading is generally accomplished by means of some type of self-loading machine, by power shovels or by elevating graders.



*Tractor and Bulldozer Owned by the Ariss-Knapp Construction Co., Working in Dublin Canyon, Calif., Bulldozing Dirt Dumped by Trucks*





2-Ton Tractor with Operator Shown Running Miami Scraper from Operator's Seat

Several types of self-loading scrapers are used behind power equipment, and in some soils they may be loaded without previous plowing. They may be classified as rotary scrapers, fresno scrapers, bottomless drag scrapers, and wheel scrapers. The sizes and capacities of these will be described under the heading of "Transporting."

There are several makes and sizes of elevating graders on the market. The larger size is generally drawn by a Caterpillar Sixty. Their output is affected by the nature of the soil and the slope of the conveyor belt which affect the capacity of the conveyor and also by the length of the furrow and the size of the wagons loaded which govern the time lost in turning and in waiting for wagons to be "spotted." In favorable soil, a furrow from 35 to 50 feet in length will produce a yard of material.

Under good working conditions an elevating grader may be expected to load 125 cubic yards of earth in one hour. When delivering directly to a fill, such a grader may be expected to excavate from 25 to 33 1/3 per cent more.

The output of a steam shovel is affected by the size of the bucket, the nature of the soil, the depth of the cut, or the breast against which it is working and whether it is loading into wagons or is overcasting. Under very favorable conditions, a steam shovel with a 3/4-cubic-yard bucket may be expected to deliver about one-half the output of an elevating grader.

These estimates of performance are given merely as a basis for determining the number and size of wagons necessary to transport the material derived from elevating graders or steam shovels.

#### TRANSPORTING

The length of haul is an important factor in the selection of equipment used in transporting excavated material. Rotary or drag scrapers are most efficient for leads up to 300 feet. Wheel scrapers from 300 feet to 1,000 feet—and wagons for leads in excess of 1,000 feet. While these distances are usually accepted as describing the field of each type, it must be understood that the length of haul is only one element affecting the selection of equipment. The nature of the soil and the method of loading also have their influence. For instance, a bottomless drag scraper pulled by a Caterpillar was recently used very economically on street excavation in the sand hills of San Francisco where the average haul was 450 feet. The job cost on this particular work was given as 14 cents per cubic yard. In another case on recent levee construction in the Mississippi Valley, wagons loaded by an elevating grader

and hauled by Caterpillars proved economical on hauls as small as 350 feet.

Rotary or revolving scrapers are built in sizes to suit the various models of tractors. They are operated by the driver of the tractor. While the following table shows their rated capacity, the actual amount of earth moved depends upon the nature of the soil and its tendency to pile up on the bowl of the scraper.

Size of Tractor	Rated Capacity of Scraper
2-Ton	11 to 14 cu. ft.—1/2 cu. yd.
30-h.p.	16 to 24 cu. ft.—3/4 cu. yd.
60-h.p.	30 to 50 cu. ft.—1 1/2 cu. yd.

Bottomless drag scrapers with power control are made for the larger tractors. They are more positive in control than the rotary scraper and are therefore adapted to doing more accurate work. Some of these are operated by the driver through a hydraulic lift, while others are operated by a helper riding on the scraper and controlled by compressed air—the compressor being mounted on the tractor and driven from the power take-off. The size built for the 30-horsepower tractor is generally rated at about 2 cubic yards and that for the 60-horsepower size is about 4 cubic yards. In this type the weight of the scraper itself is generally carried on wheels while the material itself is dragged along the ground.

The name, "Wheel Scraper," is given to a self-loading type which, when loaded, lifts the material and carries the combined weight of machine and load on wheels. It is obvious that this type of machine is easier to pull but it takes a greater time to load. The size of the wheel scraper is limited by the power required to load it. The number in the train is determined by the loading conditions and the turning radius required. These scrapers are rated as 3/4-, 1-, 1 1/4-, and 2- cubic-yard capacities, depending upon the particular manufacturer's standard. The latter is made with two buckets that are loaded separately. The following is table showing the make-up of wheel scraper trains:

Size of Tractor	Capacity of Scraper		
	3/4 cu. yds.	1 1/4 cu. yds.	2 cu. yds.
2-ton—30-h. p.	1	2	2
2-ton—60-h. p.	3	3	3

The use of larger tractors has brought into use wagons of very much larger capacity than were practical previously. Horses and mules were used to draw wagons of 1 1/2- and 2-cubic-yard capacity. The largest



Two Thirties with Ball Wagon Graders Building Reservoir for the City of Palo Alto, Calif.





*Making a Short Turn with an All-Steel Wide-Tired Dump Wagon*

crawler tractors haul specially built wagons of 3-, 5- and 7-cubic-yard capacity. The use of the larger wagons has reduced the number of delays in "spotting" wagons at elevating graders or at steam shovels. They have therefore increased the field of usefulness, making it possible to haul economically shorter distances with wagons than was previously possible.

The use of larger wagons either singly or in train generally requires one man on the dump to unload these wagons. It is reasonable to expect that a 30-horsepower tractor and one operator will replace about five teams and drivers. The following table shows the number of wagons that can be hauled behind 30- and 60-horsepower tractors under ordinary conditions:

	Size of Wagons		
	3 cu. yds.	5 cu. yds.	7 cu. yds.
30-h. p. ....	2	1-2	1
60-h. p. ....	4	2-3	2

The number of units required to keep the loading equipment busy will depend upon the capacity of the loader, the length of haul, the speed of the wagons, and the amount of delays. Recent developments of wagons with crawler treads have made it possible to haul over ground which would not support wheel wagons. They thereby make it possible to extend the working season into the rainy period.

For hauling earth from elevating grader with an output of 960 to 1,080 cubic yards per 8 hours requires equipment as follows:

	Length of Loaded Haul	
	500 ft.	1,000 ft.
30-h. p. tractor with two 3-yd. wagons or one 7-yd. wagon. 4	4	6
60-h. p. tractor with two 5-yd. wagons. 3	3	4
60-h. p. tractor with two 7-yd. wagons. 2	2	3

#### PLACING

After the material has been transported, it is often deposited in mounds that must be leveled off or crowded over the end or side of a fill. Road graders may be used for this purpose in some cases, but more often a bulldozer is more advantageous. Bulldozers are made for all sizes of tractors. Those that are hydraulically or electrically operated are more accurately controlled than those that are hand-operated, and are therefore better adapted to finishing work.

A bulldozer on a 2-ton tractor is adapted to leveling off mounds from wagons of 3- or 4-cubic-yard capacity. For larger size mounds a 30-horsepower with a bulldozer is often more economical. The latter size, under favorable conditions, will dispose of 200 cubic yards per hour when it is required to merely push the material over the bank.

Sometimes in construction work it is required that

the earth be deposited in layers and compacted by rolling with a petrolithic rolling tamper (sometimes called a "sheep-foot" tamper.) A 30-horsepower tractor will pull two of such tampers hitched in tandem. The amount of tamping necessary will depend upon the nature of the soil and the degree of compacting required. On one job in constructing an oil reservoir, the engineers required that one such tamper should be used for each 300 cubic yards of earth placed per day. This seems to be rather excessive requirements if the soil be of good firm clay. On many kinds of work one tamper will compact 750 cubic yards per day.



*A Caterpillar Sixty with Euclid 1 1/4-Yard Self-Loading Scrapers Operating Across a Ravine*

#### Theologians and Medical Students as Inspectors

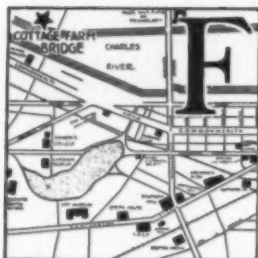
**A**T this season of the year city engineers, county engineers and highway departments are receiving applications and requests for summer jobs as inspectors. These jobs seem to be especially attractive to medical and theological students, retiring councillors and others looking for health-restoring employment, according to the *Orba*. Their ambitions and needs, no doubt, call for sympathy, if not encouragement. Students of engineering are the most deserving, as the information gained on construction is of permanent value to them and to their future work, but the contractor is also deserving of consideration with regard to the work.

The job of inspector is seldom given the consideration its importance deserves. An inspector on a work of any magnitude should be a man of experience and well balanced judgment. In the absence of these qualities, both the work and the contractor suffer. A green and incompetent inspector cannot be expected to give proper attention to the essential features of the work and generally succeeds in putting the contractor to needless inconvenience, expense and delay. An efficient inspector is a help to the contractor as well as to his employer. The poor inspector is a useless expense to everyone.

The contractor who is loaded up with a poor inspector is in an unfortunate position. If he complains to the engineer there is the possibility that the engineer may suspect an attempt by the contractor to evade strict inspection. If the inspector is not removed and hears of the complaint, he may exercise his authority to make the life of the contractor still more gloomy. Circumstances sometimes force the contractor to follow the line of least resistance.

# The New England Road Show

*Outdoor Exposition Thrives in Spite of Showers*



**F**OR the fourth consecutive year the Massachusetts Highway Association held its annual New England Construction Equipment Show on the Charles River Parkway, in Cambridge, Mass., May 9, 10 and 11, 1928. The good fortune of the three previous shows did not continue for the Fourth Annual Construction

Equipment Show, for on each day there were threatening clouds and showers. The largest attendance was on Thursday afternoon, May 10, when the big ring was

crowded with State and County Highway engineers, superintendents of streets, and road contractors, who showed much interest in the power shovels, excavators, tractors, trailers, loaders, conveyors, road-rollers, graders and concrete mixing and handling equipment.

The number of exhibitors was much greater than at any previous show and fully 50 per cent greater than last year. The land on which the show was held is filled ground and only a few feet above the Charles River. The big shovels were not able to dig in, but had to be content with their "daily dozen."

Road graders, tractors and patrol graders were active in maintaining the roadway in good condition, demonstrating their ability to handle anything from mud and



SCENES AT THE FOURTH ANNUAL NEW ENGLAND ROAD SHOW MAY 9-11, 1928

1. The Hedge & Mattheis exhibit in the foreground. 2. A Lorain-75 owned by A. G. Tomasello & Sons, Boston. 3. The Mead-Morrison shovel helps a little girl up in the world. American Tubular Tower being erected at right. 4. The Contractors and Engineers Monthly exhibit. 5. Every day these two Homelite pumps worked ceaselessly. 6. The Walter truck, Barber-Greene and Barber Asphalt exhibits. 7. The main roadway

sod to cinders, sand and pieces of stone.

The Executive Committee in charge of the Equipment Show was composed of Hon. Pehr G. Holmes, John M. McCarthy and Fred W. Mattheis, Charles F. Reuter, Ben. F. Surette, Lloyd Anderson, James J. Tobin, L. F. C. Bryant, John A. Gaffey, Fred B. Richardson, Frank C. Pillsbury, and Arthur E. Blackmer. Fred W. Mattheis, President of the Hedge & Mattheis Co., was in charge of the placing of the exhibit.

Among the manufacturers of road machinery, for construction and maintenance, and manufacturers of road material represented at the road show were:

#### MANUFACTURERS REPRESENTED

Acme Road Machinery Co., Frankfort, N. Y.; J. D. Adams & Co., Indianapolis, Ind.; Aerol Burner Co., West New York, N. J.; American Castings Co., Birmingham, Ala.; American Cement Machinery Co., Keokuk, Iowa; American La France & Foamite Corp., New York; American Tubular Elevator Co., Pittsburgh, Pa.; Ames Shovel & Tool Co., Boston, Mass.; Autocar Co., Ardmore, Pa.

Baker Mfg. Co., Springfield, Ill.; Barber Asphalt Co., Philadelphia, Pa.; Barber-Greene Co., Aurora, Ill.; Barnes Mfg. Co., Mansfield, Ohio; Barrett Co., New York; Bay City Dredge Works, Bay City, Mich.; Blaw-Knox Co., Pittsburgh, Pa.; Bucyrus-Erie Co., Erie, Pa.; Buffalo-Springfield Roller Co., Springfield, Ohio; Burch Corp., Crestline, Ohio; Butler Bin Co., Waukesha, Wis.

Carbic Mfg. Co., Duluth, Minn.; Philip Carey Co., Cincinnati, Ohio; Caterpillar Tractor Co., San Leandro, Calif.; Chain Belt Co., Milwaukee, Wis.; C. H. & E. Mfg. Co., Milwaukee, Wis.; Chicago Pneumatic Tool Co., New York; Cleveland Pneumatic Tool Co., Cleveland, Ohio; Cleveland Tractor Co., Cleveland, Ohio; Conant Machine Co., Concord Junction, Mass.; Concrete Surfacing Machinery Co., Cincinnati, Ohio; Construction Machinery Co., Waterloo, Iowa; Crowe Mfg. Co., Cincinnati, Ohio.

Domestic Engine & Pump Corp., Shippensburg, Pa.; Eastern Clay Goods Co., Boston, Mass.; Edson Mfg. Co., Boston, Mass.; Elgin Sales Corp., New York; E. D. Etnyre & Co., Oregon, Ill.; Evernu Century Sign Co., Boston, Mass.

H. E. Fletcher Co., West Chelmsford, Mass.; Four Wheel Drive Auto Co., Clintonville, Wis.; Freuhauf Trailer Co., Detroit, Mich.; Frost & Adams Co., Boston, Mass.

Galion Iron Works & Mfg. Co., Galion, Ohio; General Motors Truck Co., Detroit, Mich.; Good Roads Machinery Co., Kennett Square, Pa.; Granite Paving Block Mfrs. Assn., Boston, Mass.; W. & L. E. Gurley, Troy, N. Y.

Heltzel Steel Form & Iron Co., Warren, Ohio; Highway Service Co., New Bedford, Mass.; Highway Signal Co., Waltham, Mass.; Highway Trailer Co., Edgerton, Wis.; Homelite Corp., Port Chester, N. Y.; Huber Mfg. Co., Mansfield, Ohio; Hussey Plow Co., North Berwick, Mass.

Ingersoll-Rand Co., New York; Insley Mfg. Co., Indianapolis, Ind.; International Harvester Co., Chicago, Ill.

Jackson Mfg. Co., Harrisburg, Pa.; Jaeger Machine Co., Columbus, Ohio.

Kinney Mfg. Co., Boston, Mass.; Knickerbocker Co., Jackson, Mich.; Koehring Co., Milwaukee, Wis.; Kohler Co., Kohler, Wis.; Kwik-Mix Concrete Mixer Co., Port Washington, Wis.

La Bour Co., Chicago Heights, Ill.; Lakewood Engineering Co., Cleveland, Ohio; Lansing Co., Lansing, Mich.; La Plant-Chouteau Mfg. Co., Cedar Rapids, Iowa; Littleford Brothers, Cincinnati, Ohio.

Mack Trucks, Inc., New York; Marsh-Capron Co., Chicago, Ill.; Master Woodworker Mfg. Co., Detroit, Mich.; McCloskey Torch Co., Toledo, Ohio; McKiernan-Terry Drill Co., New York; Mead-Morrison Mfg. Co., East Boston, Mass.; Metalforms Corp., Milwaukee, Wis.; Metalweld, Inc., Philadelphia, Pa.; Monarch Tractors Corp., Springfield, Ill.; Motor Parts Co., Boston, Mass.

National Hoisting Engine Co., Harrison, N. J.; National Colortype Co., Bellevue, Ky.; N. P. Nelson Iron Works, Inc., Passaic, N. J.; New England Metal Culvert Co., Boston, Mass.; New England Road Machinery Co., South Boston, Mass.; Northwest Engineering Works, Chicago, Ill.; Novo Engine Co., Lansing, Mich.

Oulton Machine Corp., Bellows Falls, Vt.; Pierce Arrow Motor Car Co., Buffalo, N. Y.; Portland Cement Assn., Boston, Mass.

Ransome Concrete Machinery Co., Dunellen, N. J.; Reed-Prentice Corp., Worcester, Mass.; Rogers Bros. Corp., Albion, Pa.; Rotary Snow Plow Co., Minneapolis, Minn.; Russell Grader Mfg. Co., Minneapolis, Minn.

T. L. Smith Co., Milwaukee, Wis.; Solvay Sales Corp., New York; Speeder Machinery Co., Cedar Rapids, Iowa; Standard Oil Co. of New York, New York; Sterling Motor Truck Co., Milwaukee, Wis.; Sullivan Machinery Co., Chicago, Ill.; Syracuse Chilled Plow Co., Syracuse, N. Y.; Tarrant Mfg. Co., Saratoga Springs, N. Y.; Thew Shovel Co., Lorain, Ohio.

Underhay Oil Co., Boston, Mass.; Underwood Machinery Co., Boston, Mass.; Union Fork & Hoe Co., Columbus, Ohio; Union Iron Works, Inc., Bangor, Maine; Universal Power Shovel Co., Highland Park, Mich.

Walsh's Holyoke Steam Boiler Works, Holyoke, Mass.; Waukesha Motor Co., Waukesha, Wis.; Wausau Iron Works, Wausau, Wis.; C. M. White Iron Works, Boston, Mass.; Wickwire Spencer Steel Co., New York.

#### DISTRIBUTORS EXHIBITING

Aberthaw Co., Boston, Mass.; Bond Co., Boston, Mass.; Boston Tractor Co., Cambridge, Mass.; Clyde R. Dodge, Boston, Mass.; Dyar Sales & Supply Co., Cambridge, Mass.; Eastern Tractor Co., Cambridge, Mass.; Walter W. Field & Son, Inc., Boston, Mass.; Hercules Sales Corp., Boston, Mass.; Chas. J. McCarthy & Co., Boston, Mass.; New England Implement Co., Boston, Mass.; P. I. Perkins Co., Boston, Mass.; Waldo Bros. & Bond, Boston, Mass.; Clark-Wilcox Co., Boston, Mass.

## Philadelphia Skyscraper Completed

**I**N excavating for the foundations of the 30-story Fidelity-Philadelphia Trust Co., in Philadelphia, Pa., which was completed June 1, unusual formations in subterranean soil were found, providing difficult problems for the engineers to solve. These conditions, which were never before encountered in the subterranean regions of central Philadelphia, largely involved the character of the soil above the rock levels. The soil was a peculiarly impervious combination of clay and gravel which held ground water in basins but was so dense that pumping could not draw the water through it for any considerable distance.

As many as 60 pumps were used to dewater the area excavated, it being necessary to place pumps at points in the excavation for each separate foundation, in some cases not more than 10 feet apart from each other.

The rock formation was struck at various levels in a sort of rolling contour, hillocks of rock formation with filled-in valleys of clay and gravel between, necessitating the sinking of caissons to varying depths, the general average being about 62 feet below the curb level. The foundation shafts were sunk to bed-rock and the rock drilled to a depth of 10 feet to make sure of a permanent solidity.

In underpinning the foundations of the Witherspoon Building adjoining the site on the east, it was necessary to underpin these foundations to a depth of from 25 to 30 feet below the basement of that building, so that the new foundation in turn would be below the basement of the new building.

Amazing speed marked the work on this building. Its completion date was scheduled for September 1, 1928, it being finished three months ahead of time. Smooth-running organization has made possible the rapid progress. Despite the magnitude of the operation there has been little confusion or traffic congestion on Broad, Walnut and Sansom Streets around the building.

The entire lot, covering nearly a city block and with a frontage of 220 feet on Broad Street and 175 feet on Walnut and Sansom Streets, is built up solidly to and including the fifth floor. Above this floor recesses for light courts occur, forming and "H." The building is faced with specially selected Indiana limestone. It is the largest building of its kind in Philadelphia and is outstanding in massiveness, graceful lines and interesting facades.

Costs of the building, exclusive of equipment, are approximately \$8,000,000. The total costs exceed \$12,000,000. The site is assessed at \$4,800,000. Simon & Simon were the architects, Irwin & Leighton the general contractors, and Solomon M. Swaab, Consulting Engineer, all parties being from Philadelphia. An etching of the building nearing completion appears on the front cover of this issue of this magazine.

## Third Annual Craftsmanship Luncheon

**A**PPRENTICES who have won highest awards in their trade courses this year, and many Honorary Craftsmen who have recently received certificates and gold buttons from the New York Building Congress in recognition of their skill and ability, attended the Third Annual Craftsmanship Luncheon of the New York Building Congress, at the Hotel Commodore, May 17. Charles Stelzle, noted authority on labor economics, addressing the meeting on the topic, "The Road to Better Industrial Relationships," said that social, religious, political and industrial forces at work today made for the realization of the democratic ideal underlying the present unrest in this country.

An apprentice and an Honorary Craftsman were seated at each table, and exhibits of the workmanship of apprentices in the nine trades cooperating with the Apprenticeship Commission of the New York Building Congress were shown in the lobby of the Grand Ballroom of the hotel.



# Los Angeles Street Construction

*Specifications Require Extensive Hand Floating and Pavement Is Cured by Asphalt Spray*



LOS ANGELES, CALIF., has recently completed the paving by contract of a large project within city limits from First Street to Hollenbeck Avenue. This street will be a cut off, saving from 4 to 5 miles for north and south traffic in the city, on one of the main highways.

Because of a heavy rain which preceded the concreting of the first portion of the work early in March it was necessary to scarify the subgrade and continually disc-harrow it to speed up the drying of the stocky adobe. As soon as the grade was dry enough to compact with a 12-ton roller and show no signs of yielding the work of concreting was begun.

The plans call for a roadway averaging 60 feet in width laid in three 20-foot slabs. The slabs are 8 inches thick but are thickened to 10 inches at the longitudinal joints. Expansion joints are laid every 90 feet using  $\frac{1}{2}$ -inch Elastite material and dummy joints every 30 feet using  $\frac{1}{4}$  x 2-inch Elastite. The concrete is a 1:2:3½ mix, and must be mixed for at least one minute.

The city requires that grade stakes be set 5 feet on centers at all intersections. The grade is set and tested at all other points by a drag ahead of the mixer. As the specifications call for no variation of over  $\frac{1}{4}$ -inch, the contractor usually cuts as close to the required grade as is physically possible and then shovels coarse sand ahead of the drag to fill any low points.

Wells & Bressler, 3454½ Whittier Boulevard, Los Angeles, contractors for this job, are hauling in the dry batches without the cement with Ford trucks from a

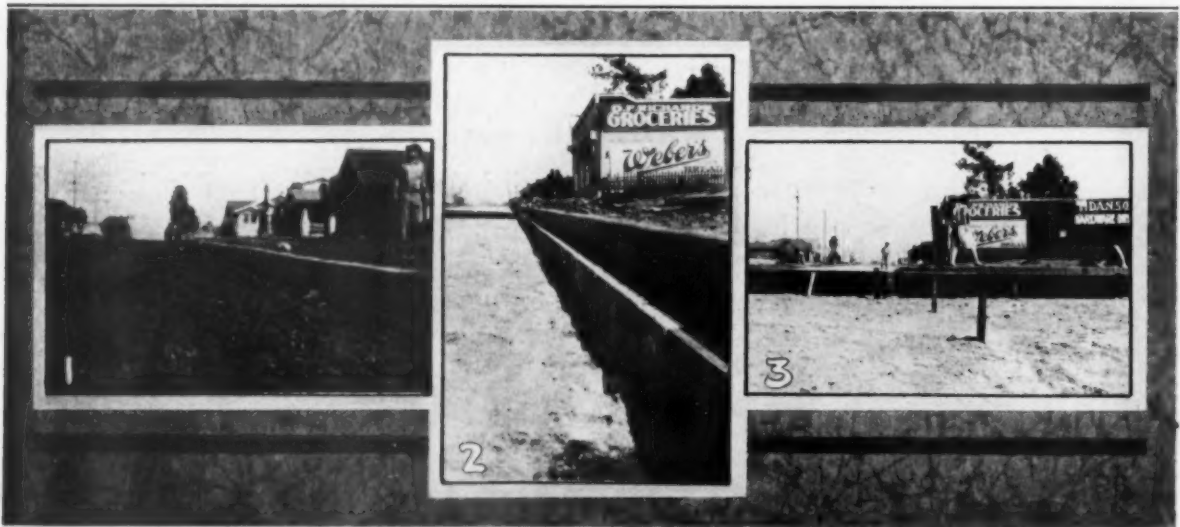
central proportioning plant. The sand is weighed, averaging 1500 pounds per batch, and the stone is measured by volume. The Union Rock Co. has several large plants near Los Angeles where it maintains central proportioning plants for commercial service.

The average concreting gang for this type of work in Los Angeles consists of 24 men as follows: 2 men dumping 7 sacks of cement into the mixer skip on the stone and sand delivered by truck; 1 mixer man; 4 spreaders; 2 clean-up men who attend to the final preparation of the grade immediately before pouring; 2 tamper men working with 2 tampers; 3 float men; 2 finishers; 2 men working continually on the curb flow line; 3 men carrying cement to the mixer; and the foreman. The average wages paid in Los Angeles and vicinity for such work are \$4 a day for labor, \$6 a day for spreaders, \$5.50 for float men and \$8 for finishers.

The mix delivered on this job by the Rex 27-E paver must have not more than  $1\frac{1}{2}$ -inch slump. As soon as the concrete is delivered to the grade the spreaders roughly even it off to the finish grade. The real grade is given by a template run on boards set to grade at the gutter flow line and at the outside of the slab. The concrete is then tamped with a steel bar tamp with  $\frac{3}{4}$ -inch bars set in the tamp. There is no reinforcement in the slab. Following tamping the surface is floated with long handled wood floats across the slab and then longitudinally with 16-foot floats from bridges by 2 men. This practically eliminates the need for the use of the straight-edge to test the pavement.

The slab is belted with a 4-ply, 8-inch canvas belt, edged and then continuously floated until the initial set begins. Then it is belted again to give the final finish.

For curing, the Hunt Process has been used with success. This consists in applying a thin coat of bitumen



PREPARATION OF THE SUBGRADE FOR PAVING, LOS ANGELES, CALIF.

1. Sticky adobe worked up after rainstorm by mule-drawn harrows to speed drying. 2. 2 x 10-inch plank set to flow line grade at curb to guide tampers. 3. Method of placing stakes at intersection to give grade



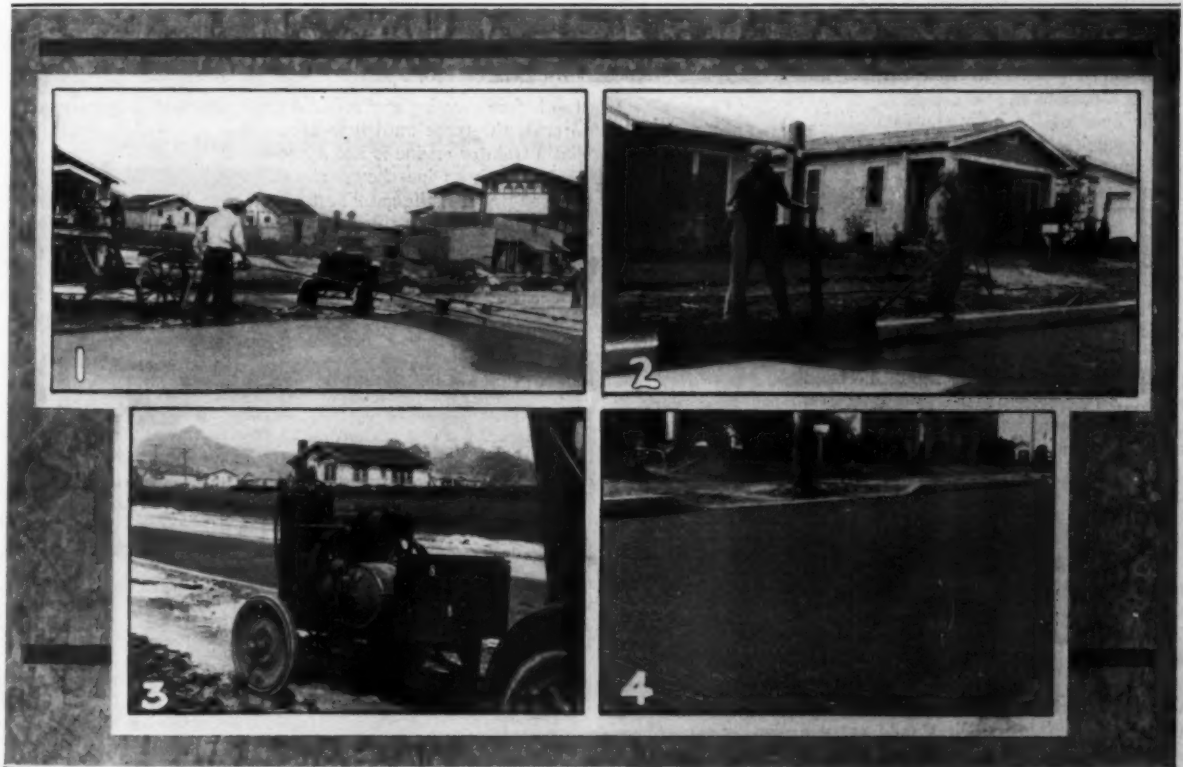


#### LAYING A CONCRETE PAVEMENT IN LOS ANGELES

1. Delivering the cement to the job. 2. Delivering aggregate from the central proportioning plant to the mixer. 3. A Rex 27-E paver on the Los Angeles road job of Wells & Bressler. 4. Hand tamping of concrete near the mixer. 5. Floating the concrete with long-handled floats. The Los Angeles specifications require that this be continued until initial set begins

composed of Trinidad Lake asphalt, Bermudez and Gilsonite. The coat is sprayed on by a De Vilbiss spray gun operated by an Essick portable compressor. The

rate of application is about one gallon to 22 square yards. The application is done by sub-contract by William Warne, Los Angeles, that the process may be



#### CURING OF LOS ANGELES CONCRETE PAVEMENT BY THE HUNT PROCESS

1. Applying the bituminous seal coat with a long-handled De Vilbiss spray. 2. Method of protecting curb from staining with asphalt when curing by the Hunt Process. 3. An Essick compressor and De Vilbiss pressure tank mounted as a trailer unit for supplying the spray gun. 4. Close-up of pavement a few minutes after application of the Hunt Process of curing. Note the belting and float marks easily distinguishable

satisfactorily controlled. Curing is effected by retaining the moisture in the concrete and not permitting it to escape into the air. This process has many advantages to the contractor. The old method of curing by earth cover and by ponding are unsatisfactory to all concerned particularly where it means the pumping of large volumes of water for considerable distances. Test by the Los Angeles County Road Department show that the pavement is slightly stronger when cured by the Hunt Process and that it is possible to open the pavement to traffic in 14 days without damage. The particular boon to the contractor seems to be the elimination of the old arguments with the inspector over the application of water to the pavement for curing and the delay in cleaning up the job. In addition, if the pavement can be accepted in 10 to 14 days instead of 21 days, it means a quicker return to the contractor. A. E. Stevens is Superintendent for Wells & Bressler on this job.

## Transporting Explosives over Highways by Motor Truck

By W. J. Pumphrey

**A** TRUCK used for the transportation of explosives should first of all be strong and rugged enough to carry the load. It should be in first class running condition and, preferably, it should have a closed body. If an open body is used, the sides and ends should be high enough to prevent the packages of explosives from falling off and the whole load of explosives should be completely covered with a fire-resisting tarpaulin to protect it from weather and from sparks from passing locomotives.

The floor of the body should be tight so that nothing can pass through it and come in contact with the muffler or exhaust and any exposed metal on the inside of the body should be covered with wood.

A type of muffler or exhaust from which spent gas is discharged downward to the ground along the entire length of the muffler and not out of the rear end is less likely to cause fire from muffler explosions.

The battery and wiring should be so located that neither will come in contact with packages of explosives. To prevent short-circuiting, wearing of the insulation, fire and possible explosion, all electric wiring should be completely protected and securely fastened. If the insulating is in the least worn it should be immediately repaired. Should an electric current come in contact with explosives, an explosion might result.

The trucks should be equipped with not less than three fire extinguishers of a make approved by the National Board of Underwriters, located at convenient points, filled and ready for immediate use.

To reduce fire hazard and risk of explosion, the truck engine, the pan, the chassis and the bottom of the body should be kept free from surplus oil and grease.

A truck used exclusively for the transportation of explosives should be painted or marked permanently with the name or trademark of the company or individual operating it and the word "Explosives." When a truck is used occasionally for transporting explosives, it should carry a sign or placard on each side and on the rear end bearing the words "Explosives—Handle Carefully—Keep Fire Away" or should display a red flag 24 inches square marked with the word "Danger" in white letters.

A truck used for transporting explosives should be inspected daily in order to determine that—

- Fire extinguishers are filled and both extinguishers and equipment are in good working order,
- Electric wiring is completely insulated,
- Chassis, engine, pan and bottom of body are clean and free from surplus oil and grease,
- Gasoline tank and feed line have no leaks,
- Brakes and steering apparatus are in good order, and that
- Truck is in proper condition in all other respects for handling explosives.

### TRUCK OPERATION

It is dangerous to overload a truck with explosives and to place packages of explosives, whether the truck is overloaded or not, in such a position that they may fall off.

It is extremely dangerous to transport blasting caps or electric blasting caps on the same truck or vehicle with other explosives.

It is dangerous to transport in the body of trucks containing explosives any metal, metal tools, carbides, oils, matches, firearms, electric storage batteries, inflammable substances, acids, oxidizing or corrosive compounds. Explosions have occurred on vehicles transporting explosives with some of these commodities.

It is dangerous to use bale hooks or other metal tools for loading or unloading explosives.

When transporting explosives, the truck should be driven by and be in charge of a driver who is careful, capable, reliable, able to read and write the English language, and not addicted to the use of intoxicants or narcotics. He should never smoke while on or near the truck, nor carry matches, firearms or loaded cartridges. He should be familiar with road rules and also with the state laws and the local ordinances and regulations governing explosives in the cities in and through which it is necessary to travel or pass and should comply with them. He should have the truck always under complete control and should never allow it to coast down hill. He should, of course, be familiar with the proper manner of handling explosives.

Unauthorized persons should not be permitted to ride on trucks transporting explosives.

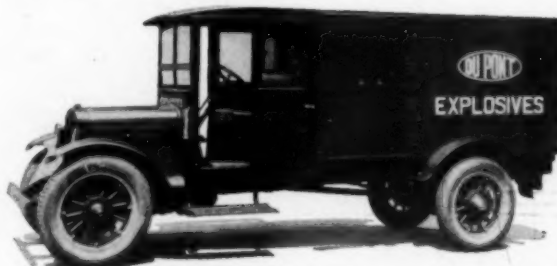
When transporting explosives, the truck should come to a full stop before crossing any railroad track and should not attempt to cross the track until it is known that the way is clear and that a train or engine is not approaching.

The truck engine should always be stopped when gasoline is being put into the gasoline tank.

A truck containing explosives should never be left without first stopping the motor and securely setting the brakes. When transporting explosives over the highways, it is advisable to avoid unnecessary stops. Stops for meals should be made at some wayside restaurant and the truck should be left well away from traffic and parked vehicles. A truck containing explosives should never be taken into a garage or repair shop.

Explosives should never be left anywhere unless they are placed in a magazine and the magazine is locked, or are delivered to some one authorized to receive them. In unloading, packages of explosives should never be piled immediately back of the exhaust as a spark may start a fire and cause an explosion.

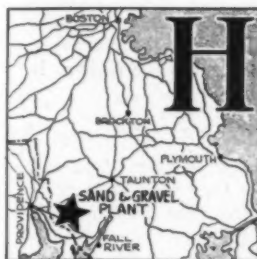
It is safer to transport explosives in daylight.



*A du Pont Explosive Truck Embodying All Possible Safeguards*

# The Rehoboth Sand and Gravel Plant

*Lane Construction Corp. Develops  
Large Gravel Pit for Jobs  
of Unusual Haul*

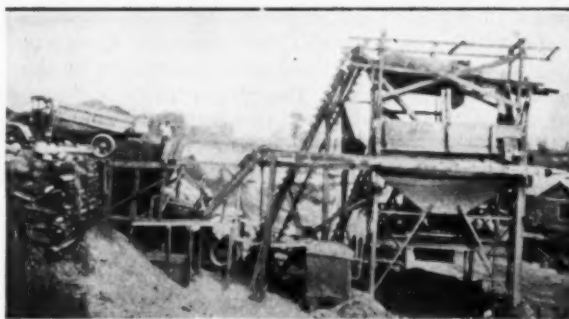


AUL is a big factor in determining the availability of a gravel pit for use in connection with a road project. The Lane Construction Corp., Meriden, Conn., had a large road project in Rhode Island near the Massachusetts border that required gravel and plenty of it. A large pit at Rehoboth, Mass., was secured

and worked throughout the 1927 construction season. At one time the haul to the job was nearly 14 miles, but the plant was paid for and the gravel was satisfactory to the Rhode Island authorities, and it seemed advisable to pocket the minor loss in the long haul.

The site of the gravel pit was an apple orchard which had for many years been used as a run for pigs; consequently, the ground was saturated with acids that made the upper 5 feet of gravel useless for concrete. This material was stripped and then the Erie shovel began loading the Mack trucks with the bank-run gravel. E. H. Young, Inspector for the Rhode Island State Board of Public Roads, made from two to ten tests a day from the material as it was being handled by the shovel. Each test took about ten minutes and included both sieve and color tests as described below.

The Mack 5-ton trucks hauled the bank run material to the crusher, dumping the material through a rail



*Truck Delivering Bank-Run Material to the Bar Screen*

screen to take out the rock too large for the crusher. From the crusher the material went to the bull screen which had 2-inch openings. Rejects went to a belt conveyor which returned them to the crusher. All material passing the 2-inch screen was used in the mix. The crusher-run material dropped into a steel bin which had four Erie Aggregometers attached. Fords with hand dump bodies brought in large stone from clean-up of shoulders and dumped it into the crusher pit.

The 4-batch Mack trucks which hauled to the job, ran under the bins and received their four batches at once from the batchers.

## PROVISIONS FOR FIELD TESTS

Inspection of materials at the point of production is considered a very essential part of road construction by the Rhode Island State Board of Public Roads. Each project, therefore, carries a Material Inspector whose duties cover not only the inspection of materials but also supervision of the batching operations when carried on at the plant. The equipment provided these inspectors includes a portable field office, heating equipment, screens, sieves, balances, report blanks, etc., and plenty of 3 percent sodium hydroxide solution for making color tests on sand. Heating equipment is provided for quickly drying samples of sand taken for tests and consists of either a small 2-burner oil stove or a Sterno (solidified-alcohol) stove. An innovation from the usual equipment for color tests on sand is the use of a wide mouth nursing bottle of 10-ounce capacity. These bottles have the ounce graduations on the side but are an improvement over the prescription bottles usually advocated. A handful of sand can be readily poured into the bottle and as easily emptied without special screening or drying in the preparation of the sand. A solid-rubber stopper completes this equipment and at least a dozen bottles are available at each plant. This number provides for testing several samples at a time or a series of bottles may be used to show the trend of color of the sand over a short period of time.

Sand and gravel are subjected to further tests on the job by occasional visits of an inspector from the Ma-



*Four-Batch Mack Truck with Aggregate Starting on Its 39-Mile Round Trip*



materials Testing Laboratory. Two visits are made to each concrete job each week and the inspection includes the taking of a sand and a cement sample from any truck and following the batch through the mixer to the subgrade. Three cylinders and three beams are made from this batch when it has reached the subgrade. These tests, made independently of the personnel on the job, give a real comparison between the various contracts because all of these check cylinders and beams throughout the state are made by this same inspector. Complete quality tests are made by the Testing Laboratory on the samples mentioned above. This gives officials in charge of construction a knowledge as to whether the materials are living up to the original diagnosis of quality and whether the field control is keeping the materials actually up to standards required.

In addition to these check tests, two beams are cast daily on each concrete job, one in the morning and one in the afternoon, from average batches, for controlling the date of opening the pavement. These beams are usually broken at a 7-day period. The results of these tests are awaited eagerly by both the contractor and the engineers alike, for upon the result of these tests depends the early opening of the pavement. Any variation below 40 pounds per square inch, set as the minimum modulus of rupture for 7 days, calls for immediate investigation and has helped greatly in keeping materials up to the required standards. Average 7-day results for 1927 were safely above this minimum, being 495 pounds per square inch on six concrete jobs.

## Building Codes in a Changing Industry

By A. S. Brock

*Structural Engineer, Portland Cement Assn., Chicago, Ill.*

**I**N the past few years much has been said and written about building codes. The interest in this subject has been nation-wide and is a natural outcome of the great increase in volume of building construction throughout the country. At the present time, we are spending six billion dollars per year for new buildings in the United States. It is a matter of common information that the activity in the building industry in the past few years has buoyed up general business conditions and probably prevented business depressions on occasions. Anything that has an effect on the building industry has an effect on the entire country.

A factor which may be of more importance than cost and efficiency of labor, cost of materials, kind of construction, cost of equipment, overhead, etc., is the building code, since the building code lays down definite rules covering all phases of building construction.

The United States Senate Committee on Reconstruction, appointed in 1920, investigated the underlying reasons for the high cost and inactivity in building industries in all parts of the country. In almost every city where hearings were held, statements were made to the effect that local building laws required more materials or refinements of workmanship than were justified, considering the purpose of the buildings affected.

### BUILDING CODES LAG BEHIND METHODS OF CONSTRUCTION

Great advances have been made in the building industry, especially in the past 30 or 40 years. Modern building uses different materials, different methods and different designs. New types of buildings have been developed to meet new needs. The concrete block and tile industry, new types of concrete floors, forms and reinforcing, welding of structural steel, fire

protection materials, new mechanical and plumbing equipment and many other phases of changing mode of life and construction, impress us all the more with the need of building codes that will keep up with the rapid change and not hold us back to specifications drawn up forty years ago. It is also probable that future building codes will permit the use of higher stresses for concrete. The changing of materials, methods, etc., in the building industry is to be expected; it is the rule, rather than the exception. As a further proof of the changing building industry, we need but point to the periodic revisions of building codes. In the larger cities, building codes are revised every ten or fifteen years, while in the smaller cities the revision is less frequent.

### TWO TYPES OF BUILDING CODES

There are two types of codes: the "specification" type and the "regulation" type. The first is the type we find in practically all cities. It is a development from the familiar architect's specification and is voted on and approved in its entirety by the legislative body, either city council, city commissioners, or state legislature, if it happens to be a state code. It is subject to change only through legislative action and is usually the result of many compromises when first passed. The few times that it is revised are those special occasions when some persons have such an interest at stake that they will spend the time and effort to have it changed. Otherwise, it is fixed and inflexible. It is passed and approved by men not familiar with the building industry.

The "regulation" type of code permits change without legislative action, in that it should not operate as a hindrance to progress and development, and finally in that it permits the merits of the particular questions to be decided by a body of experts well qualified and unprejudiced. The rules and regulations of building codes should not be the subject of legislative action but rulings of a properly appointed regulatory body called a "building commission." Incorporated in the law which creates this commission should be the statement that it is unlawful to construct buildings or other structures which are hazardous to life, health or property from fire, collapse or any other cause. It should state in a brief way that the building commission shall adopt what means of enforcement seem advisable and, further, in this "creating" or "enabling" law should be the provision for the penalty in case of violation. Under proper operation of this type of code, the building regulations would be removed from the field of politics and favoritism to the field of engineering and merit.

### STATE REGULATORY CODE WOULD HELP SMALL CITIES

In smaller cities where a building commission would be out of the question, a state building code is the only satisfactory solution. A movement is under way in Illinois which, it is hoped, will produce a state building code during the next session of the legislature.

This will make enforcement a much simpler and easier problem. It will give a higher authority to whom to appeal for interpretations and information and a decided help in enforcement, if needed.

### "REGULATION" CODE IS THE REMEDY

Building codes lay down conditions under which billions of dollars' worth of buildings are constructed each year. When they are wisely drawn and wisely administered and have the proper flexibility to meet the needs of the changing building industry to protect the public, they reduce fire hazards and do the greatest good to the greatest number of people. The solution of the question lies in the adoption of the "regulation" type of code for the state and larger cities, which will have rules formulated by qualified men, subject to alteration as the changing building industry demands.

ACKNOWLEDGMENT.—From a talk delivered before the Building Inspectors Section of the Illinois Municipal League at Peoria, Ill., November 17, 1927.





*Upper Des Lacs Lake Looking East Showing the Muck Around the Fill in the Lake*

ing a rod, showed muck to range up to 26 feet in depth with 10 feet of water.

It was decided to use the section line for approaches; make the maximum grade 7 per cent; leave the old swing bridge in place and make a fill across the lake or rather on each side of the swing span. Plans were prepared by the Bridge Department of the State Highway Department. A contract for one mile of work was awarded to Schultz Bros. of Bowbells, North Dakota, at a bid of \$98,361.49.

#### EMBANKMENT

The embankment across the lake, 1615 feet in length, was designed to use 141,644 cubic yards of excavation; an allowance of 40 per cent being made for shrinkage. The road is to have a 28-foot top, side slopes of 2 on 1 above the water, 3 on 1 below.

To protect the side slopes from wave action, a brush mattress (modified Missouri River Revetment) is to be laid thereon at equal distances above and below the water line. To secure the mat in place, a system of longitudinal and transverse cables was devised; the transverse cables passing under and over the mat, thence through the embankment to the mat on the opposite side. Upon this mattress, stone paving of field rock is to be laid, 1 foot thick at the edges and 2 feet thick at the water line. Cribbing timbers made by spik-



*Not an Uncommon Event on the Slippery Grade. No Permanent Damage Was Done, However*

ing old bridge planks together are to be placed at the lower edge of the mattress, to prevent the paving from slipping and sliding. As an additional precaution, a floating boom of timber in sections of 50 feet will be installed on each side of the fill.

At each end of the 125-foot swing bridge, it was decided to drive a line of 50-foot piling, extending out thirty feet at right angles to the center line. These were to be held in place by means of a rock fill on one side and the embankment on the other. Immediately back of the piling, a curtain wall and bridge seat of timber were to be erected to be held in place by cables anchored to adjacent bents of the old trestle and by bracing additional bents, one to the other.

#### MAKING THE FILL

Before beginning actual construction work, Schultz Bros. had intended to use a narrow gauge railway and



*Fill on the West Side of Upper Des Lacs Lake, Showing the Muck Pushed Up from the Bottom by the Fill During the Summer of 1927*

dump cars but decided the condition of the old trestle involved too great a risk. It was decided to push the grade out by means of a "bulldozer," on a 10-ton Caterpillar tractor.

Work was commenced April 25, 1927, with considerable frost still in the ground. Wagons were loaded by a  $\frac{3}{4}$ -yard Bucyrus steam shovel and hauled to the dump by Caterpillar tractors. Good progress was made until May 10, when a late blizzard piled the cut nearly full of snow and held up operations one week.

#### MUCK RISES

When the dump had been pushed out 200 or 250 feet from the shore line, patches of muck appeared above the lake surface 80 to 100 feet away on each side. Shortly after this, the muck appeared ahead and around the fill forming a crescent. At this juncture, it was decided to strengthen those old piles at the east end of the swing span to which braces for holding the bridge seat and curtain wall were attached. Accordingly, four  $\frac{3}{4}$ -inch cables were fastened to the piles of one bent and anchored to a deadman buried back in the fill. This held for a short time, then the piles snapped below the muck. By this time, the muck had pushed up against the new piling around the end of the swing bridge, but the swing showed no signs of being disturbed or pushed out of place. It was decided to anchor all the





*Rock Paving or Riprap on Revetment*

piling at the end of the swing bridge to deadmen. Work was resumed; when the dump was within 50 feet of the bridge, the extreme wing piling went nine feet out of place, forward and slightly to one side. The center piling supporting the bridge seat and curtain wall went forward about one foot or enough to prevent opening and closing of the waterway.

There were 1300 cubic yards of rock on the opposite side of the piling. In spite of the fact that the lake bottom beneath the muck slopes downward on a 4 per cent grade, the rock had remained above the water level for some time and had shown no indication of settlement. Muck at this point was 14 feet deep, covered by 10 feet of water.

#### TEMPORARY TRESTLE

A temporary trestle was built to span the gap between dump and swing span. Excavation was "bulldozed" off the swing span and was given up after two days' trial. Operating tractors, wagons and a bulldozer on a bridge 18 feet wide was not conducive to progress. The four-wheel scraper and "old Dobbin" were left to work out this proposition. The outfit was moved over to the west shore by barges.

#### OPERATIONS FROM WEST SHORE

On the west side of the lake, the action of the fill on the muck was much the same as on the east, only in a greater degree. At first a quaking, quivering mass of foul smelling dark gumbo appeared, being pushed up slowly but steadily as the fill grew, often being six feet above the water. It hardened and fissured on the surface as time went on. Those courageously inclined could walk over it. Old piling were snapped off below, carried forward like soldiers on parade by this irre-



*Mattress in Process of Being Woven on Side of Grade and on Ice*

sistable black mass, finally toppling over to lie prone or disappear into the murky depths.

As a rule, a narrow channel of water remained between the muck and fill but now and then, the mud would pile up and roll back on the dump. The muck directly ahead of the fill was so compact that the 10-ton Caterpillar tractor was run out where there was less than one foot of fill. This was done, not once but several times. These times were exceptional and not the rule. Very little settlement was noticed.

The entire fill had to be raised one or two feet every week throughout the season. Some weeks no advance into the lake was made. It kept the outfit busy to hold what they had gained. During the night, longitudinal sections of the fill would crack off in lengths varying up to 100 feet. Settlement ranged from a few inches to 4 feet. Once a section covering 25 or 30



*Stone Paving and Revetment on North Side of Fill at the West Side of the Lake. Note Also Large Amount of Muck Pushed Up Toward the Middle of the Lake*

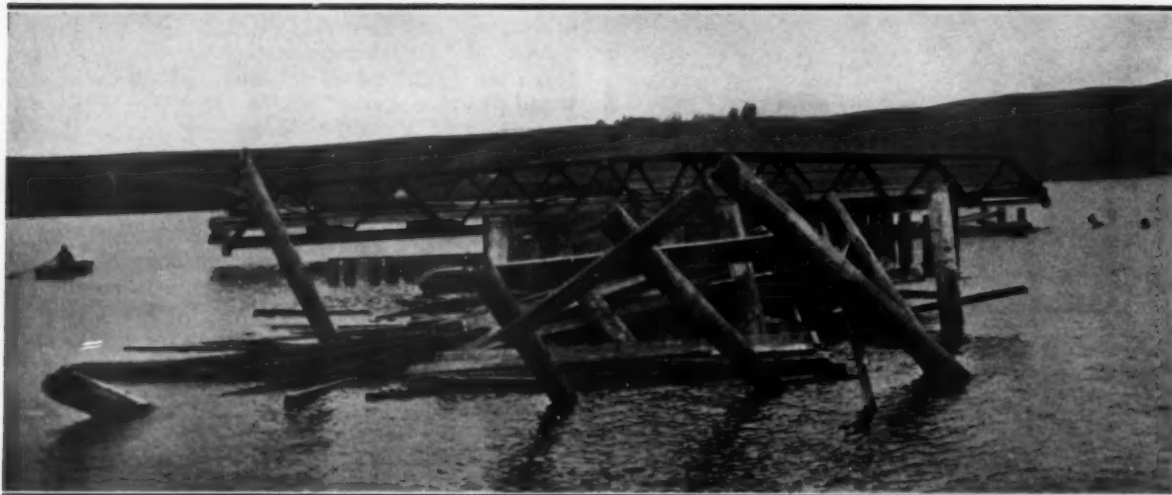
square feet of area along the center line dropped down 3 feet. This was in a part of the grade that had been constructed for some time. Each settlement spread the muck out more and more, the outer edge often being 125 feet from the side slope. The fill has progressed 600 feet from the west shore and 400 feet from the east shore.

#### RAIN ADDED TO TROUBLES

The past season was adverse to progress. Seventeen days of actual work only were performed from April 25 to June 25. The contractor was able to do real work totalling only a few weeks during the entire season. Two or three hours of hard rain meant the loss of as many days.

#### FROM MUD TO DUST

A night shift was tried. A few days of dry weather



*Swing Span of the Upper Des Lacs Lake Bridge at Bowbells Open, Showing the Piling Being Forced Up by the Fill*

and strong winds made the dust unbearable and dangerous for the "cat skimmers." Grades down which the dirt was hauled varied from 7 to 15 per cent. One stretch was over a coulee where the fill was 30 feet in height. Sprinkling was resorted to; a light application was time wasted; a heavy application made the roadway slippery and hard to negotiate. Finally, fresh excavation was spread over the roadway bladed off daily and sprinkled lightly with water. This worked admirably and produced excellent results.

#### QUICKSAND AND RUBBERY CLAY

Water and quicksand, where least expected, were encountered in the cut high up on the slope of the hill. At times, with great difficulty, one wagon only could be hauled through this sodden ground. The shovel had to leave this place several times to allow the water to drain off. In some places bluish white rubbery clay predominated. The shovel was taxed to make an advance of forty feet during the day while taking out a strip 4 feet deep and 15 feet wide.

#### ROCK FILL

Rock was added periodically throughout the season to the rock fill around the ends of the swing span. The rock was piled up 4 or 5 feet above the water line. At the east end, the rock would remain stationary for a short time, then settle slowly or disappear overnight. A total of 3077 cubic yards has been used. Some signs of settlement were noted during the winter. The center piling supporting the bridge seat and curtain wall have been forced back into place; those on the extreme end of the line have gone back some but probably never will return to their original position.

At the west end of the bridge, a total of 1800 cubic yards of rock has been placed. No decided settlement has been observed since the middle of October. The rock on the east end of the bridge is on the down hill side of the piling while that on the west end is on the uphill side. Muck is present here as usual, the rock forcing it up. The waterway beneath the east end of the bridge is practically blocked.

#### BRUSH MATTRESS

In February, 1928, 18,800 square feet of brush mat-

tress had been woven on that part of the west fill adjacent to shore. Diamond willows were shipped from the Missouri River Valley at Williston, N. Dak., by freight and hauled out to the lake by truck. Chokecherry brush used on the underwater portion of the mat was secured in the Mouse River Valley, twenty miles east of Upper Des Lacs Lake and hauled overland by truck. The mattress is similar to the revetment used by the War Department on the Missouri River. The mat used on F. A. P. 303-A is thicker and of very close weave or stitch.

For the stone paving to cover the mat, rock was gathered from the shore of the lake and hauled over the ice by horse-drawn sleds. The loads varied from 2 to 7 cubic yards. The rock were laid on edge on the mat, the interstices being chinked with smaller stone.

In weaving, the cherry brush made a thicker mat owing to its numerous small branches. It required more cherry brush to produce the same number of squares. That part of the mat upon the ice is expected to settle during the breakup without disturbing the paving to any extent. What action the drifting ice floes will have upon it remains to be seen.

#### 1928 WORK PLANNED

From the results of last season's work, it is certain that considerable extra excavation will have to be used to bring the embankment up to specifications. The deepest part of the lake has not been reached. At the close of last season, it was decided to raise the embankment one foot vertically and widen the top three feet.

The fill has taken a slope under water of approximately 3 to 1 as near as it can be measured. No tests have been made to determine the cross section of the fill but this will probably be made during the present season.

#### Quantities of Materials for Concrete

**T**HIS is the title of a new bulletin of the National Sand and Gravel Association, Inc., Munsey Building, Washington, D. C., which presents information on the quantities of materials required for concrete, in a somewhat different manner. These tables are based on recently developed fundamental principles, and are believed to be unusually accurate.

# Constructing 2½ Miles of Storm Water Drain

By O. Bonney

Sewerage Relief Engineer, Columbus, Ohio



IN November, 1925, a special one mill tax levy to extend over a five year period was submitted to the voters of Columbus, Ohio, for the purpose of financing an extensive program of sewerage relief in certain sections of the city where the existing sewers and storm drains were greatly overtaxed. This measure received a favorable vote and estimates made at that time indicated that about \$3,000,000 would thus be made available during the five years. Prior to the passage of the tax levy preliminary plans only had been prepared for the various sewerage relief measures contemplated and so some little time elapsed before con-

tract drawings for any of the larger projects could be prepared. A small amount of work was placed under contract in the spring of 1926, but it involved nothing worthy of any particular note and it was not until the late spring of 1927 that bids were invited on work of large magnitude.

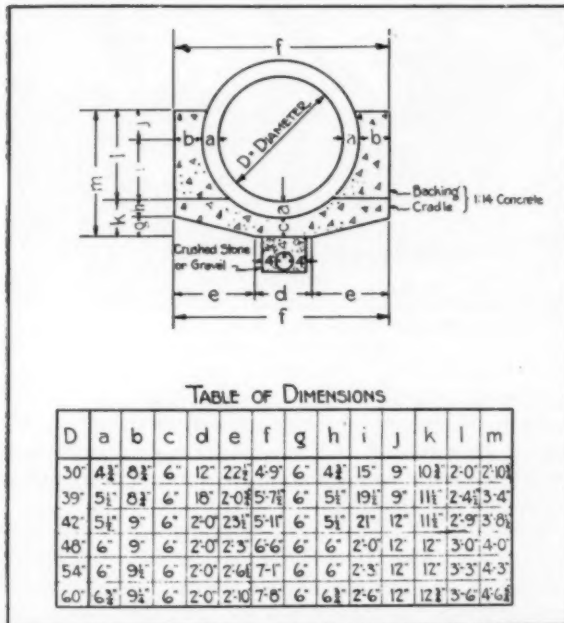


Fig. 1.—Dimensions of Vitrified Segment Block Tile Drains

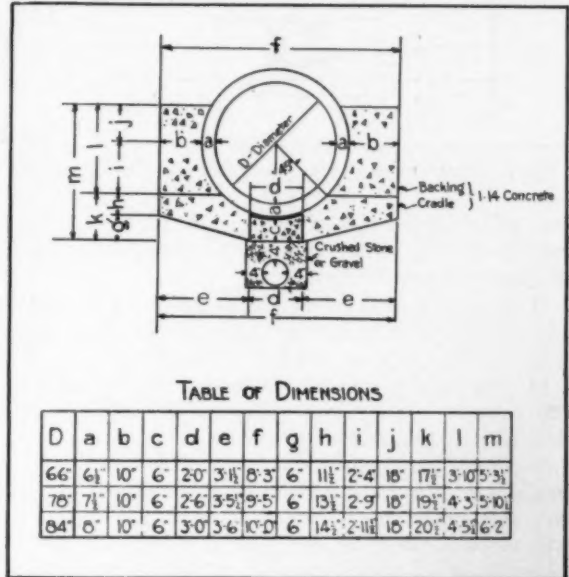


Fig. 2.—Dimensions of Reinforced Concrete Pipe Drains

## THE SOUTHEAST RELIEF STORM DRAIN

Bids were received on June 21, 1927, for Sewerage Relief Contract No. 3, Southeast Relief Storm Drain. Ben Canini of Columbus, Ohio, was low bidder and the contract, consisting of some 1,400 linear feet of 108-inch diameter unreinforced monolithic concrete section, 250 linear feet of special 84- x 108-inch reinforced monolithic concrete section, 3,000 linear feet of 84-, 78- and 66-inch reinforced concrete pipe, 3,200 linear feet of 60-, 54-, 48-, 42-, 39-, and 30-inch vitrified clay segmental block, 6,000 linear feet of 24- to 8-inch vitrified clay pipe together with manholes, appurtenances,

### SUMMARY OF MAJOR ITEMS—CONTRACT PRICES—SOUTHEAST RELIEF STORM DRAIN

Diameter of Drain in Inches (1)	Length in Feet Approx. (2)	Average Cut in Feet (3)	Excavation per Cubic Yard (4)	Concrete per Cubic Yard in Monolithic Section (5)	For Cradle and Backing (6)	For Furnishing and Laying Pipe or Block per Linear Foot (7)	Average Price per Linear Foot (8)	Remarks (9)
108	1400	22.5	\$2.25	\$13.50	.....	.....	\$45.00	Monolithic concrete
84x108	250	24.4	3.00	*18.00	.....	.....	88.00	
84	600	16.8	1.25	.....	\$8.50	\$16.00	\$17.75	Reinforced concrete pipe
78	1900	13.0	1.25	.....	8.00	14.50	27.00	
66	500	11.6	1.25	.....	7.00	10.00	19.50	
60	750	11.7	1.25	.....	8.00	9.00	17.75	Vitrified clay segment block
54	200	12.0	1.25	.....	8.00	8.00	16.50	
48	750	14.8	1.25	.....	8.00	7.00	15.60	
42	800	17.0	1.25	.....	8.00	5.25	13.70	
39	375	16.9	1.25	.....	8.00	5.00	12.90	
30	400	12.7	1.25	.....	8.00	3.60	9.10	

\* \$26.20 per cubic yard including Reinforcing Steel Bars







*Northwest Crane with Pull Back Shovel Used in Excavating Trench for Reinforced Concrete Pipe*

time working on the vitrified pipe drains. The first organization released from this work was placed back on the segment block. This required the contractor to rent a considerable amount of equipment but on the other hand allowed him to complete most of the work before weather conditions prevented any very extensive operations.

Figures 1, 2, 3 and 4 show the cross sections of the segment block, reinforced concrete pipe, unreinforced and reinforced monolithic concrete drains. "Wolverine" cement and aggregates obtained locally were used for concrete throughout the job.

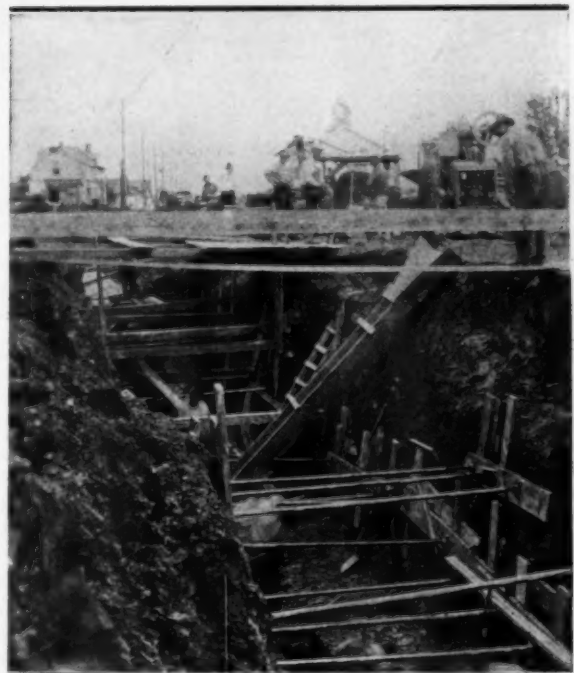
#### BUILDING SEGMENT BLOCK DRAINS

Excavation was done entirely by a Northwest pull shovel, the excavated material consisting of yellow clay with occasional sand and gravel streaks. Some timbering and bracing was required but in general the banks of the trench stood up very well and the excavation was generally held to the limits required for the drain sections. The bottom of the trench was shaped to conform



*108-inch Monolithic Concrete Drain Under Construction on Sewerage Relief Contract No. 3, Columbus*

very nearly to the bottom of the concrete cradle. In places, the bottom of the trench was in water-bearing gravel and an 8-inch sub-drain was carried all the way. Crushed stone was placed around the sub-drain and the concrete cradle consisting of 1 volume of cement to 14 volumes of sand and coarse aggregate mixed was placed. The cradle was screeded to the required shape in 20-foot sections and allowed to set 24 hours before block were placed on it. Ordinarily the block laying was commenced at the end of 24 hours. The invert block was first laid in a bed of mortar and the subsequent blocks to the springing line were laid in full mortar beds simultaneously with the placing of the concrete backing which was a 1:14 mix. The arch was usually placed some 24 hours later, the blocks being laid in full mortar beds and the concrete backing carried up to the required point. The arch forms were removed immediately



*Preparing the Trench for the Storm Drains on Sewerage Relief Contract No. 3*

and the blocks allowed to settle down into the green mortar. Upon completion of the arch, dirt backfilling was carefully tamped up to a point flush with the top of the arch. Backfilling beyond this point was done with the Northwest shovel with clamshell attachment. Progress on this work averaged about 40 feet of completed drain per day for a 10½-hour working day. Test cylinders made from the 1:14 concrete used in the cradle and backing indicated, when broken, a compressive strength of about 1,200 pounds per square inch at 28 days. "Amco" vitrified clay segmental blocks, manufactured by the American Vitrified Products Co., were used.

#### MANUFACTURE OF REINFORCED CONCRETE PIPE

The reinforced concrete pipe was made by the Independent Concrete Pipe Co. of Indianapolis, Indiana, along the line of the work, thus making the pipe avail-



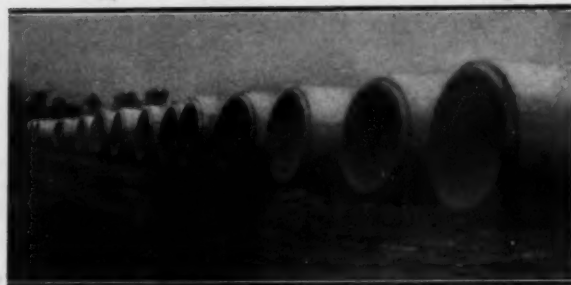
*General View of the Open Trench Showing Sheet piling and Piping for Well Points*

able to the contractor with a minimum haul. The mix used was 1 volume of cement to 5 volumes of sand and coarse aggregate, the proportion of sand to coarse aggregate varying slightly from day to day throughout the job in accordance with frequent analyses of the aggregates made by the Engineer. The concrete was required to be mixed in the mixer for at least 3 minutes. On the 66-inch pipe a  $\frac{1}{4}$ -cubic-yard mixer was used and the concrete wheeled up an incline to a platform on a level with the top of the 66-inch forms, which were 4 feet high, and the concrete dumped and spaded into the forms. On the 84-inch and 78-inch pipe a  $\frac{1}{2}$ -cubic yard mixer discharging above the level of the top of the pipes was used and the concrete spouted to the forms and spaded. The 84- and 78-inch pipe were 5 feet long. The forms were usually removed in 24 hours and the pipe was cured by sprinkling for six days. Test cylinders of the concrete delivered by the mixer were made 3 times daily by the Engineer. The average compressive strength at 28 days was 3,400 pounds per square inch with a maximum of 4,900 and a minimum of 2,000 pounds per square inch, 80 per cent of the cylinders broken showing better than 3,000 pounds per square inch.

#### EXCAVATING FOR AND LAYING REINFORCED CONCRETE PIPE

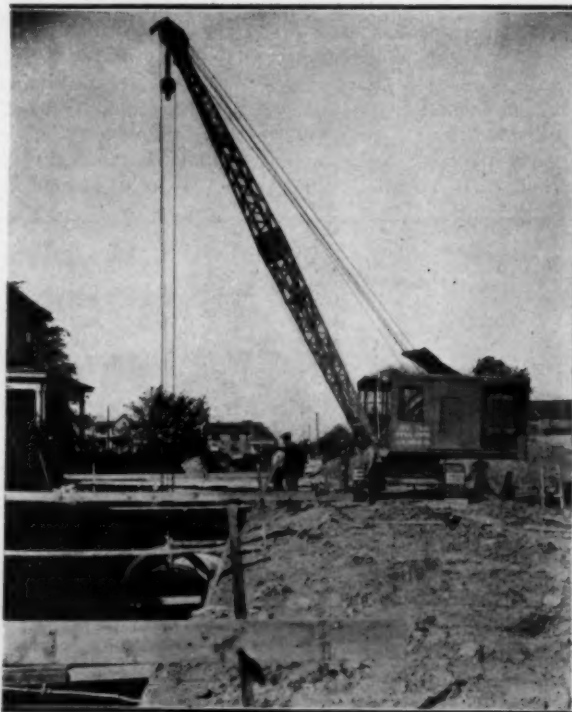
Work was started on the 84-inch section, the 66- and 78-inch sections being built successively. A Northwest pull shovel was employed on the excavation which consisted mostly of coarse gravel. Excess excavated material was loaded on trucks and disposed of as excavated.

At the bottom considerable water was found and an 8-inch sub-drain was carried all the way. In spite of the fact that the excavation was 16 and 17 feet deep, and in gravel, the banks stood almost vertical with no timbering or bracing as long as was necessary to complete the work. The bottom of the trench was shaped as nearly as possible to conform to the bottom of the concrete cradle. Concrete blocks of 1:14 concrete, 12 inches long, other dimensions conforming to those shown in Figure 2, were first cast in place in the bottom of



*66-inch Reinforced Concrete Pipe Made by the Independent Concrete Pipe Co. for the Columbus Work*

the trench to the approximate grade of the bottom of the pipe, the blocks being located at the joints between pipe. When these had set sufficiently the pipe was lowered with a Northwest shovel equipped with a cable and boom attachment and placed on a bed of dry mortar on the block. The joints were then made and when the mortar in the joints had set the concrete cradle and backing was placed. Backfilling was done with a Northwest shovel equipped with a clamshell. Special pipe, 2 feet long, were used on all curves. Progress on this work averaged about 50 feet of completed drain per



*Crane Lowering Reinforced Concrete Pipe in Trench*





*The 60-inch Segment Block Drain Under Construction*

day for an 11-hour working day.

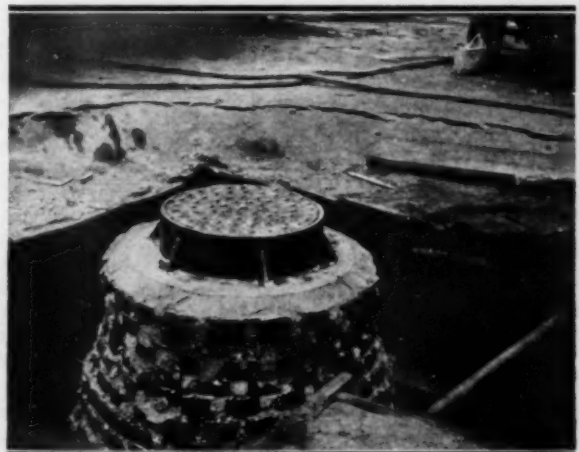
#### 108-INCH MONOLITHIC CONCRETE SECTION

A Northwest shovel with dragline attachment was employed on the excavation which consisted mostly of coarse gravel with fairly stiff blue clay at the bottom. The gravel carried considerable water and a 10-inch sub-drain was required throughout the length of the job. The 108-inch drain was located throughout its entire length in a private right-of-way used for truck gardening, one of the articles of agreement between the city and the property owner being that the top soil be stored and placed back on top of the trench upon completion of the work. The top 18 inches were therefore excavated and loaded on trucks and hauled to points designated by the owners of the property for storage. The banks of the trench were sloped down to a point about level with the top of the drain. From this point to the bottom of the excavation the banks were vertical and sheeted. For the lower section of the drain, wooden forms 20 feet long were used and for the arch Blaw-Knox collapsible steel forms. As indicated in Figure 3, the construction joint was located about 1 foot below the springing line. The bottom of the excavation was shaped to fit the lower half of the drain. Concrete mixed in the proportions of 1 volume of cement to a total of 6 volumes of sand and coarse aggregate was used, the relative proportions of sand to coarse aggregate being varied slightly from day to day. The invert forms were kept in place 24 hours. Upon removal of the invert forms the upper 1½ inches of concrete at the longitudinal construction joint were picked off, which was in accordance with the specifications, this being required as a safeguard against a poor joint due to the formation of laitance. As soon as the work of removing the upper 1½ inches of concrete was completed the arch forms were placed and the arch poured, the arch

forms being kept in place for 60 hours. Concrete was mixed in a 1-cubic-yard mixer on the bank of the trench opposite the section being poured, the stock piles of aggregate, cement, etc., being located at convenient points along the line of the work. Progress on the work averaged 12 to 15 feet of completed drain per day of 10 hours. Test cylinders taken three times daily throughout the job indicated, when broken at 28 days, an average strength in compression of about 2,500 pounds per square inch.

#### 84- x 108-INCH REINFORCED CONCRETE SECTION

This section was required for a length of about 250 feet across the Norfolk and Western Railway Co. right-of-way and adjacent property. The railroad tracks were supported on 30-inch steel I-beams bearing on piles driven on each side of the trench. Excavation was done entirely with a steam shovel for the top cut and a clam-shell for the balance. The excavated material was coarse gravel. The banks of the trench were sheeted and braced from a point about 6 feet below the ground level. Wooden forms built in collapsible sections so that they could be easily moved ahead were used. The section was poured in 3 operations, as indicated by the construction joints shown in Figure 4. The invert or bottom section was poured first, then after 24 hours the side walls were poured and after 24 hours set on the side walls the top slab was poured. Side wall and arch forms were kept in place 4 days. The same precautions in regard to poor joints due to the formation of laitance as were taken on the 108-inch monolithic section were observed here. The contractor was required to remove the upper 1½ inches of concrete at all horizontal, longitudinal construction joints. A 1:6 mix was used, the relative proportions of sand to coarse aggregate being determined by the Engineer from day to day. Work was carried on, on this section, after cold weather set in with salamanders and canvas covers, all aggregates being heated. The temperature of the concrete was kept above 50 degrees Fahrenheit at all times for 5 days after pouring. Ordinarily concreting operations were permitted in temperatures down as low as 20 degrees Fahrenheit. Progress on this section averaged only about 6 feet of completed drain per working day of 10 hours.



*Cracking of Asphalt Paving Adjoining the Sewer Trench*



*Open Trench, Showing 84-inch Reinforced Concrete Pipe Drain Completed Except for Backfill*

#### WORK REMAINING TO BE DONE

The work under this contract is practically completed at this time. What little work remains to be done consists for the most part of repaving over the trenches and cleaning up. It is anticipated that the entire work will be finished within the time limit. Bids were taken April 10, 1928, for the remainder of this project and the contract, amounting to \$143,700 was awarded on April 20, 1928, to the C. & G. Construction Co., of Columbus, Ohio, and the work is now under construction.

## The Responsible Bidder Legally Defined

**I**N decisions compiled by the Associated General Contractors of America as to the legal interpretation of the term "responsible bidder," at least two general rules have been formulated out of the many cases which have been decided by law with respect to the term and with respect to the discretionary powers of awarding officials. The first general rule, as deduced from the cases under consideration by the A. G. C., is that, in awarding contracts, public authorities are vested with discretion in determining who is the lowest and best bidder, and their decision will not be interfered with by the courts, even if erroneous, provided it is based on a sound and reasonable discretion, founded on facts and exercised in good faith, in the interest of the public without collusion or fraud, nor corruptly, nor from motives of personal favoritism or ill-will, and not abused. (38 L. R. A. N. S. 655, note.) The second is: the determination of who is the lowest bidder, with the qualification of responsibility, rests not in the exercise of an arbitrary, unlimited discretion of the officer or board awarding the contract, but upon the exercise of a bona fide judgment, based upon facts tending reasonably to the support of such determination. There must be a rational basis of fact to support such determination. (50 Am. St. Rep. 490.)

Although statutory laws in the United States have almost invariably stipulated that contracts for public construction shall be awarded to the lowest responsible bidder—a procedure established to safeguard the public welfare—and this requirement

universally known and approved, compliance therewith on the part of Federal, State, County and Municipal awarding officials has been the exception rather than the rule. This condition is not due to any willful misconduct on the part of award officials, but to a wide-spread misinterpretation of the word "responsible," and to misunderstanding of the discretionary powers of awarding officials as defined by the courts.

Partly because of criticism, which awarding officials have experienced when they rejected an irresponsible bidder, and partly through the assumption of discretionary powers by the fiscal agencies of government, public awarding agencies, with some exceptions, have gradually lapsed into what might be called the "easiest way" of handling awards, namely, by interpreting the term "responsible" to mean any bidder who supplies a corporate surety bond. In the Federal Government particularly, this assumption has been carried to the point where Federal construction agencies doubt that they have a legal right to investigate the responsibility of a bidder or to confine awards to those who are competent to carry out their commitments. The Comptroller General of the United States has indicated that contracts must without exception be awarded to the lowest bidder who can provide a surety bond.

Since under existing conditions in the underwriting field, practically any bidder can secure a bond, the awarding official is commonly placed in a position where he must award contracts to bidders known to be irresponsible through lack of experience, resources, organization or character. Naturally, therefore, public construction has been beset with thousands of defaulted contracts, the award of which could in no sense be construed as in the public interest. The complaint has arisen from numerous public officials, particularly in the highway field, that they are practically unable to place their work in the hands of competent contractors.

The surety bond does not guarantee the public against all losses that are liable to grow out of a defaulted or improperly performed contract, and the surety companies have stated clearly that it is not a guarantee of responsibility. Practically speaking, it merely guarantees that the work will somehow be completed and, that barring escape on technicalities, a considerable portion of any direct financial loss will be made good. It provides no protection against the many indirect losses which result when any kind of construction is delayed or the contract defaulted.

Within the last few years, public officials generally have sensed the evils of this condition, and many of them are struggling to reach a position where they can carry out the spirit of the law. For the benefit of those officials and others, who are interested, the Associated General Contractors of America has compiled the tabulation of legal decisions interpreting the word "responsible" and defining the discretionary powers of public officials. Without exception these decisions imply that it is not only the privilege but the duty of public officials to investigate contractors and to make awards only to those who are competent to perform their contracts.

ACKNOWLEDGMENT.—From a release of the Associated General Contractors of America. Copies of the decisions may be obtained from the offices of the Associated General Contractors of America, 1150 Munsey Building, Washington, D. C.

## Simplified Practice Recommendation for Forms for Concrete Ribbed Floor Construction

**T**HE Division of Simplified Practice of the Department of Commerce has circularized manufacturers, distributors, and organized users of concrete ribbed floor construction for written acceptance to the simplified practice recommendation for Forms for Concrete Ribbed Floor Construction, approved by a general conference held March 21, 1928, at Biloxi, Miss. At least 80 per cent of the known manufacturers, distributors, and organized users must accept the recommendation in writing before it will be published by the Department of Commerce.



*To keep P & H shovels going during the rainy season in Cuba*

## The bull that gets there

Gasoline, because of its portability, is the only fuel that gets thru. Two Waukesha-equipped power shovels running twenty hours a day never quit on account of the daily down-pour. Twenty miles of sucking mud knee deep to an overgrown giraffe separated the shovels from the railroad. But 12 head of well-fed bulls got gasoline thru and the rainy season did not hold up bulls, shovels or work.

*For the tough job and the one farthest from supplies you will find experienced contractors pick Waukesha-powered machinery. They know Waukesha "Ricardo Head" engines have no equal for economy—here's a case where every gallon counts—or for reliability and power—were a break-down may mean days of expensive idleness. Waukesha Heavy-Duty Industrial Engines are used by those manufacturers most jealous of their reputation. Write for Industrial Bulletin No. 662.*

N-832-L

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# Who's Who in Construction

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- B—Between \$1,000,000 and \$5,000,000
- C—Between \$500,000 and \$1,000,000
- D—Between \$250,000 and \$500,000
- E—Under \$250,000

**Hitchcock and Tinkler, Inc., Denver, Colo., 330 U. S. National Bank Building.** Branch office: 3914 Woolworth Building, New York. Organized 1923. Bus. vol. C. This company was formed for the purpose of building the 6-mile Moffat Tunnel in Colorado, which has recently been completed. The officers were all formerly connected with the Mac Arthur Brothers Co. of New York, in executive capacities. Officers:



F. C. Hitchcock

F. C. Hitchcock, President; C. C. Tinkler, Vice-president and General Manager; A. H. Baer, Secretary and Treasurer. Major contract: 1923-1927, Moffat Tunnel. Member: A. G. C. of A.



C. C. Tinkler



A. H. Baer

**The Peck-McWilliams Co., Norwich, Conn., 45-55 West Main Street.** Organized February, 1916. Bus. vol. D. This company succeeded Peck, McWilliams & Co., a partnership that was formed in 1892. Officers: Henry G. Peck, President and Treasurer; Frank D. Davis, Assistant Treasurer and Secretary; Paul H. Zahn, Superintendent of Construction. Major contracts: 1924-25, Nurses' Home, Backus Hospital, Norwich, Conn.; 1925, Administration Building, Manchester, Conn.; 1925-26, Lincoln School, New Britain, Conn., and buildings for the Southern New England Telephone Co., at Willimantic and Windsor, Conn.; 1927, Dime Savings Bank Building, Norwich, Conn., and Community Church, Storrs, Conn. Member: Norwich, Conn., Chamber of Commerce.

**American Paving Corporation, Omaha, Nebr., 1325 Grace Street.** Organized May 26, 1920. Bus. vol. B. During the years of 1922 and 1923 this company operated a filling station building business. Officers: C. Louis Meyer, President; T. F. Kennedy, Treasurer; Harry A. Koch, Secretary; M. R. Homer, General Manager; J. A. C. Kennedy, Director. Major contracts: 1925, 16 miles of paving in Douglas County, Nebr.; 1926, 23 miles of paving in Mohaska County, Iowa, and 7½ miles in Jefferson County, Kans.; 1927, 23 miles of paving in Dubuque County and 17 miles in Pottawottamie County, Iowa, and 4½ miles in Johnson County, Kans. Member: A. G. C. of A. of Nebraska, Iowa, Kansas and Illinois.

**Christensen, Jacob & Gardner, Inc., Salt Lake City, Utah, 308 Vermont Building.** Organized 1921. Bus. vol. E. This company was originally organized as a partnership in 1919.

Officers: W. W. Gardner, President; A. E. Christensen, Secretary and Treasurer. Major contracts: 1925, resurfacing pavement on the Layton-Clearfield Road; 1926, pavement District No. 150, Ogden, Utah; 1927, resurfacing pavement on the Salt Lake-Bountiful Road, and building the Stadium of the University of Utah. Member: Inter-mountain Branch of A. G. C. of A.

**Arthur L. Smith & Co., Washington, D. C., 2525 Pennsylvania Avenue, N. W.** Organized 1911. Bus. vol. C. Arthur L. Smith, sole owner, was an architect and engineer on the Pacific Coast when he took over the construction of barrack buildings for the U. S. Government in the Philippine Islands. In 1911 he began constructing buildings in Washington, D. C., and Virginia. Major contracts: Auditorium for the Library of Congress; S. E. Branch building of the Public Library; power plant building for the Bureau of Standards; warehouse for the H. J. Heinz Co.; school building at Falls Church, Va.; office building for the Washington American League Baseball Club; several large churches and other buildings. Member: Local Builders and Manufacturers Exchange, of which Mr. Smith is President, and the Board of Trade of Washington, D. C.

**Murphy & Pryor, Orlando, Fla., 415 Exchange Building.** Organized September, 1925. Bus. vol. C. The co-partners, W. T. Murphy and J. E. Pryor have been operating in Tennessee and vicinity since 1900. The present company was organized to execute a \$3,000,000 paving contract in Orlando, Fla. Major contracts: 1926-27, \$3,000,000 paving contract in Orlando, Fla.; 1927, concrete bridge for the Florida State Road Department.

**Henkel Construction Co., Mason City, Iowa, 728-29 M. B. A. Building.** Organized 1920. Bus. vol. C. This is a partnership of Wm. Henkel and Carl Henkel, Wm. Henkel having been in the contracting field for 35 years. Major contracts: 1924, grading, culverts, and paving of Route 3, Sections 82 and 83, Morgan and Scott Counties, Ill., 13 miles, and grading, bridges and culverts and paving of Route 2, Sections 71 and 72, La Salle Co., Ill., 14 miles; 1925, grading, bridges and culverts and paving of Route 23, Sections 29, 30 and 31, De Kalb Co., Ill., 20 miles; 1926, grading, and paving of Federal Aid Project No. 159, Wapello Co., Iowa, 9 miles; 1927, grading, culverts and paving of Route 162, Sections 101 and 102, Bureau Co., Ill., 13 miles, and grading, culverts and paving of Route 18, Sections 19, 20, 20X, La Salle Co., Ill., 13 miles. Member: Illinois Association of Highway and Municipal Contractors, which is a chapter of the A. G. C. of A.

**J. S. Metzger & Son, Los Angeles, Calif., 332 W. Jefferson Boulevard.** Organized October 20, 1920. Bus. vol. D. J. S. Metzger has been in business since 1909, admitting Donald E. Metzger as a partner in 1920 and operating as a co-partnership until October 20, 1925, when the business was taken over by Donald E. Metzger as sole owner. The firm specializes in class "A", "B", and "C" construction, consisting of public and semi-public buildings and corporation work. Major contracts: 1925, David and Margaret Home, La Verne, Calif., Odd Fellows Temple, Orange, Calif., and the Rosewood Methodist Church, Los Angeles, Calif.; 1926, La Verne College at La Verne, Calif., Shippers'

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Long Life with  
Minimum Cost of Upkeep



The Ransome 27-E Master Paver owned by the Carolina Contracting Company

**H**ERE'S what the Carolina Contracting Company of Spartanburg, S. C. wrote us:—

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CHICAGO, ILL. Hunsome Concrete Machinery Co.  
CINCINNATI, OHIO The C. Taylor Hardware Co.  
CLEVELAND, OHIO E. F. Pope Co.  
COLUMBIA, S. C. Construction Equipment Co.  
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MONTREAL, CANADA Canadian Equipment Co.  
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NEWARK, N. J. Johnson & DeLong, Inc.  
NEW HAVEN, CONN. The W. I. Clark Co.  
NEW ORLEANS, LA. Chas. E. Olson  
NEW YORK CITY Ferguson & Hudson  
NORTH BRITAIN, N. Y. F. G. MacDonald  
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PHILADELPHIA, PA. C. J. & Son  
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SEATTLE, WASH. West Machinery Co.  
SPOKANE, WASH. Halliburton Co.  
ST. LOUIS, MO. Lewis Equipment & Machinery Co.  
SYRACUSE, N. Y. The Wheeler-Murray Co.  
TOLEDO, OHIO National Supply Co.  
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**New Jersey**

Hotel at Brawley, Calif.; Sigma Chi Fraternity, Los Angeles, Calif.; 1927, Huntington Park Union High School Boys' Gymnasium at Huntington Park, Calif.; 1927-28, Monrovia High School at Monrovia, Calif., and Elks Club, Monrovia, Calif. Member: Builders Exchange, Los Angeles, Calif.

**Cannell-Conrad Construction Co., Inc., Louisville, Ky.,** 67 Todd Building. Branch offices: Cincinnati, Ohio, and Evanston, Ill. Organized November, 1922. Bus. vol. C. Chas. E. Cannell has been in the general contracting business for the past 35 years, originally in Cleveland, Ohio. He has made a specialty of sewer and water construction. The firm was originally Cannell & McDowell, later C. T. McCracken & Co. Officers: Chas. E. Cannell, President and J. V. Conrad, Secretary and Treasurer. Major contracts: Beargrass Creek contract, Louisville, Ky.; 38th and 40th Street sewers at Louisville; Louisville Water Co. tunnel at Louisville; Duck Creek Sewer at Cincinnati, Ohio; and sewers in Evanston, Niles Center, Wilmette, and Tessville, Ill. Member: Cincinnati Chapter of A. G. C. of A.

**Dunham Construction Co., St. Louis, Mo.,** 316-9 Chemical Building, 8th and Olive Streets. Organized March 1, 1926. Bus. vol. C. This company was originally organized as Nelson-Bixby Co., in March, 1925. It was bought and re-organized by E. M. Dunham, who had just completed the Concordia Seminary Group in St. Louis, and who was formerly with Fruin Colton, James Stewart and Stone Webster. Officers: Edward M. Dunham, President and Treasurer; Geo. G. Prendergast, Vice-President; W. F. Woods, Secretary. Major contracts: prior to Dec., 1926, residences to the amount of \$358,000, and Roe School Addition, \$62,500; 1927, Long School Addition, \$62,500, high and low pressure engine houses, boiler house and coal receiving house, \$780,000, new city water-works at Howard Bend and filter and head house at Howard Bend, \$161,000. Member: Master Builders Association, Chamber of Commerce of St. Louis, Industrial Club of St. Louis, and A. G. C. of A.

**Winston-Dear Co., Minneapolis, Minn.,** 801 Globe Building. Branch offices: Steubenville and Smithfield, Ohio; Higbee and Hermann, Mo., and La Calle, Ill. Incorporated February, 1903. Bus. vol. B. This company succeeded the partnership of Winston Bros. & Dear. Officers: J. H. Ellison, President; F. H. Holladay, Vice-President; L. L. Dodge, Secretary and Treasurer. Major contracts: stripping and loading iron ore on Mesaba and Cayuna, Minn., iron ranges, on the Shada and Evergreen mines; stripping and mining coal on Howard County Co.'s mines in Missouri and the Bituminous Collieries Co.'s mines and the Seneca mines in Johnston County, Ohio; stripping quarries in La Salle Co., Ill.; railway construction on Missouri-Pacific Railway. Member: Minneapolis Civic and Commerce Association, and A. G. C. of A.

**Mac Arthur Concrete Pile Corp., New York, 19 W. 44th Street.** Branch offices: 134 No. La Salle St., Chicago, Ill.; 325 No. Cortez St., New Orleans, La.; 10 Cathcart St., Montreal, P. Q.; Union Trust Building, Pittsburgh, Pa.; 108 Massachusetts Ave., Boston, Mass.; 70 Ohio Street, Buffalo, N. Y.; 155 Montgomery St., San Francisco, Calif. Organized 1911. This company was organized as the MacArthur Concrete Pile & Foundation Co., in Delaware, the name being recently changed and it becoming a New York corporation. Officers: Wm. M. Chadbourne, Chairman of the Board of Directors; D. McG. Newton, President; A. F. Barnes, Vice-president and General Manager; Morgan W. Jopling, Treasurer, and R. E. Talmadge, Secretary. Major contracts: 13 gasholder foundations covering holders ranging in size from 2,000,000 to 15,000,000 cubic feet in capacity for such companies as: Los Angeles Gas Co., Los

Angeles, Calif.; Peoples Gas Light & Coke Co., Chicago, Ill.; Public Service Gas Co., Newark and Dumont, N. J.; Detroit City Gas Co., Detroit, Mich.; Brooklyn Union Gas Co., Brooklyn, N. Y.; Jersey Central P. & L. Co., Wildwood and Belmar, N. J.; Hartford Gas Co., Hartford, Conn.; Penna. Gas Co., York, Pa.; etc. Paper and pulp mills for Port Alfred Pulp & Paper Co., Port Alfred, P. Q.; St. Lawrence Paper Mills, Three Rivers, P. Q.; roundhouse and terminal for the Canadian Natl. Rys., Toronto, Ont.; coke plant for the Wheeling Steel Corp., Fallonsbee, W. Va.; Wing No. 2 and Plant No. 2 for the Firestone Tire & Rubber Co., Akron, Ohio; machine shops for the Baldwin Loco. Wks., Eddystone, Pa.; Amer. Natl. Bank, Beaumont, Tex.; Univ. of Wis., Milwaukee, Wis.; Eighth Street Viaduct, Cincinnati, Ohio; U. S. Post Office, Williamson, W. Va.; public schools at Asbury Park and Belleville, N. J.

**Robert G. Lassiter & Co., Raleigh, N. C.,** Raleigh Building and Loan Building. Branch offices: Oxford, Greensboro, Greenville, Wilson, High Point and Salisbury, N. C.; Columbia, Lexington and Florence, S. C.; Oxford, Miss.; Montgomery, Ala.; Miami, Jacksonville, West Palm Beach and Lake Worth, Fla. Organized 1916. Bus. vol. A. Robert G. Lassiter started in business as an individual in 1914. Today, the company's operations extend over the entire South, and embrace street paving of all types, highway construction, and all municipal improvements. Officers: Robert G. Lassiter, President; Wm. C. Mallonee, Vice-president; W. H. Ragland, Vice-president; Ben. K. Lassiter, Secretary; W. T. Ragland, Treasurer; and Geo. R. Goodwin, Assistant Secretary. Major contracts: in Raleigh, High Point, Miami, Guilford Co., N. C., Baton Rouge, La., and projects for the South Carolina, the North Carolina and the Louisiana State Highway Commission. Member: Asphalt Association, and A. G. C. of A.

**The Moran Construction Co., Omaha, Neb.** 2915 No. 16th Street. Organized April, 1922. Bus. vol. D. Officers: Frank J. Moran, President. Major contracts: work in Brown County, Kans. for Kansas Highway Commission, \$85,000; 6-mile concrete road for the Iowa State Highway Commission, \$160,000; concrete road for the Nebraska Highway Commission, \$55,000. Member: Omaha Chamber of Commerce, and A. G. C. of A.

**O'Connell & Sweeney, Cincinnati, Ohio,** Kellogg Avenue and Tennyson Street. Organized March, 1922. Bus. vol. B. Officers: Robert D. O'Connell and Joseph R. Sweeney, partners. Major contracts: This company specializes in sub-division work. Member: A. G. C. of A.

**C. L. Burt, Hutchinson, Kans.,** 1005 N. Washington St. Organized May 1, 1925. Bus. vol. D. Major contracts: 1925, sewers and water-works at Lakin, Kans.; 1927, sewers and water-works at Hillsboro, Kans., and sewers and water supply at Perryton, Texas. Member: Kansas Contractors Association and A. G. C. of A.

**The John W. Cowper Co., Inc., Buffalo, N. Y.,** Fidelity Building. Branch offices: Healey Building, Atlanta, Ga. Organized April, 1915. Bus. vol. B. Officers: J. W. Cowper, President; S. K. Pierce and G. W. Carlton, Vice-presidents; H. C. Shirley, Treasurer; J. W. Van Allen, Secretary. Major contracts: heavy foundations for rolling mills of the Bethlehem Steel Co., Lackawanna, N. Y., over \$2,000,000; cracker bakery and garage of the National Biscuit Co., Buffalo, N. Y., \$1,000,000; hotel at Charleston, S. C., \$1,250,000; barracks at Fort Benning, Ga., \$700,000; store building for A. Victor & Co., Buffalo, N. Y., \$650,000; Athletic Club, Buffalo, N. Y., \$1,250,000, silk plant at Elizabeth, Tenn., \$700,000, and office building at Buffalo, N. Y., \$500,000. Member: Associated General Contractors of America, U. S. Chamber of Commerce and Buffalo Chapter of the A. G. C. of A.



# The Story of ACCURACY in Neptune-built Meters



## CHAPTER 1 of a series

### Virgin metals accurately proportioned for uniform mixtures

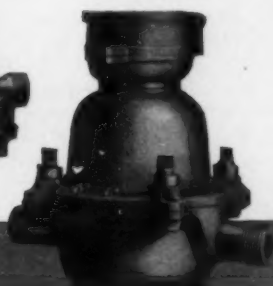
Dictated by the Laboratory, the proportions of virgin metals—copper, lead, tin, zinc, in Trident and Lambert Meters are most carefully controlled, so that each part of each meter will best withstand operating conditions. Uniform bronze, for instance, is essential for strength and maximum resistance to wear. Accuracy characterizes every step in the making of Trident and Lambert Meters. It is the principal reason for their *sustained accuracy* in service. Watch for next chapter—"In the foundry."

*Of Trident and Lambert Meters ("The Cash Registers of the Water Works Field") over 4,500,000 have been made and sold the world over.*

TRIDENT



LAMBERT



NEPTUNE METER COMPANY  
THOMSON METER CORP.

50 East 42nd Street, New York City

*"Pioneers in Meter Progress"*

Yesterday—TODAY—Tomorrow

# Legal Points for Contractors

*These brief abstracts of court decisions in the contracting field may aid you in avoiding legal difficulties. Local ordinances or state laws may alter the conditions in your community. If in doubt consult your own attorney*

Edited by A. L. H. Street, Attorney-at-Law

## Validation of Municipal Contracts

A contract for public improvements in a subdivision adjoining the then existing limits of the City of Ft. Myers, Fla., was invalid because the improvements were constructed outside the limits. But, according to the holding of the Florida Supreme Court in the case of *Hendry vs. Kellow*, 114 So. 235, decided October 24, 1927, the Legislature had a right to, as it did, legalize the contract by extending the city limits so as to include the area in question.

## Liability of Indorsers of Notes

*Lordi Construction Company vs. Armstrong*, 225 New York Supplement, 731, a case decided by the Appellate Term of the New York Supreme Court, December 20, 1927, involved the liability of indorsers on a note held by the construction company. The court decided the following propositions of law, in line with what is held by most courts throughout the country:

An indorser of a note cannot evade liability on the ground that he indorsed as a mere accommodation to the maker of the note.

The fact that the maker may have had ground for a good counterclaim against the holder of the note is not available to the indorsers.

## Expert Testimony in Building Cases

The existence of a legal cause of action and *proving* it are two widely different things. Mr. Doe, an attorney, recognized this when Mr. Roe, a client, complained that while passing under the window of a financially irresponsible enemy a bucketful of paint had mysteriously fallen all over him. Doe gave this as his advice, which was as sound as it was terse: "If you have witnesses it is assault and battery; otherwise, it is a misfortune!"

The testimony of the builder or the architect may be the turning point in a lawsuit in which he appears as a witness on his own behalf or that of another. And since it is a matter of daily occurrence for builders and architects to be called into court as expert witnesses, it should prove to be a matter of general interest to understand the more important legal aspects of their testimony.

When any expert witness is permitted to express an opinion there is a departure from the general rule that witnesses are to be permitted to testify to facts only; it being the province of the judge or jury hearing the case to draw conclusions. This departure is permitted under an exception to the general rule—an exception that must be made in view of the fact that jurors are not supposed to be able to apply expert knowledge to some facts presented to them. They may know that driving an automobile along a crowded city street at 45 miles an hour is unsafe; thereby making it improper to have witnesses express opinions to that effect. But it does not follow that testimony concerning the details of given building construction will enable jurors to draw conclusions as to whether it has been properly or improperly done, without the aid of expert opinions.

So, in the case of *Long vs. John Breuner Co.*, 172 Pac. 1132, a case involving a question as to whether an inclined approach to a store entrance had been negligently constructed on too steep a grade, thereby causing a pedestrian to fall, it was

decided by the California District Court of Appeals, May 27, 1918, that it was proper to permit an architect to testify that the usual grade was three per cent and that ten per cent was the greatest approved grade.

And a standard legal authority has made this summary of the law in the United States concerning the admissibility of expert testimony relating to the building trades:

"The proper manner of conducting ordinary building operations, the time required therefor, the cost thereof, the life, strength, and other characteristics of building materials, including their adaptability for certain purposes, and the effect produced upon them by decay or heat, may be stated by a witness skilled in the particular line involved in the inquiry, unless the fact is one within the special function of the jury to determine. A builder may state what forms of construction would be covered by a certain designation, and a gas fitter may testify whether gas meters are usually classified as gas fixtures. Testimony as to whether it was possible for an employee, walking on a girder during the erection of a building, to pass a brace without taking hold of it, has been held competent." 22 Corpus Juris, 538.

## What Must an Owner Pay When He Discharges a Contractor?

A very instructive appellate court decision on the subject of the measure of damages recoverable by a building contractor where he is wrongfully prevented by the owner from fully performing his agreement appears in the case of *Di Luck vs. Bradner Co.*, 190 Pac., 904, decided by the Washington Supreme Court, June 15, 1920.

The Superior Court in Seattle allowed plaintiff damages for wrongful cancellation of a contract for the construction of floors in an apartment building, but the Supreme Court reduced the amount of the award on the ground that excessive damages were awarded, saying:

"The testimony shows that the profits which might reasonably be anticipated upon the contract as awarded would amount to \$332.85; this being the difference between the contract price and what it would have cost the plaintiff to have performed the work called for in the contract. . . . The testimony also shows that, had the contract been performed, the plaintiff intended to work thereon, and he would have been provided with 34 days of work at \$7 per day, and that during the period he would have been performing the contract he diligently sought for other work and secured it, for which he earned \$105, and the judgment allowed him the difference between \$238 and \$105, or \$133.

"This second item of damages was erroneously allowed for the reason that the contract was a building contract, and not a contract for services, and plaintiff is not entitled to double damages by treating it as both sorts of contracts. When the work was done, had he completed it, he would only have received the contract amount, which would have included his own work or the work of whomsoever he had employed in his stead; for all of the work was to be done for the price of the contract. When the defendants let the contract, they were not hiring the plaintiff, nor was it material to them whether he labored himself or secured and paid for the labor of others."

# TRUSCON CURB BARS

These specially rolled steel sections with their thick protecting faces are placed in the curb forms before concrete is poured and so become an integral part of the construction. They give to the curb a wear-proof, shockproof nose that is permanent assurance against cracking and chipping. Furnished in standard lengths of 8 feet, 10 feet and 12 feet and supplied bent to radius for corners.

## The Complete Line of Truscon Products for Better Roads and Pavements

**WELDED STEEL FABRIC** for Permanence and Economy.

**DOWEL CONTRACTION JOINTS** for Eliminating Cracks.

**STEEL ROAD FORMS** for Accurate Construction.

**RIB BARS** for Supplementary Reinforcing.

**CURB BARS** for Protecting Curbs.

Our 184 page illustrated Hand Book "Modern Road Construction" free to Engineers and Contractors.

**TRUSCON STEEL COMPANY, YOUNGSTOWN, OHIO**



# Construction Industry News

**The American Hoist & Derrick Co.**, St Paul, Minn., has announced the reorganization of the company, as of May 1, to form a corporation with the following officers: F. J. Johnson, President and Treasurer; Howard S. Johnson, Vice-president in Charge of Sales, and Frederick Crosby, Vice-president in Charge of Production. The partnership interest of W. O. Washburn has been purchased and taken over by F. J. Johnson, who was the senior partner, and is one of the founders of the business.

**The T. L. Smith Co.**, 1030 32nd Street, Milwaukee, Wis., has announced the appointment of the Leland Truck Equipment Co. of Tulsa, Okla., as its distributor for the entire state of Oklahoma. This company has been prominently identified with the sale of oil field equipment, and has handled for some time such construction equipment lines as Novo engines, and Barber-Greene loaders.

**The Ingersoll-Rand Co.**, 11 Broadway, N. Y., has announced the addition of a seventh size to its line of portable air compressors. This new size, 4¾-inch bore by 4-inch stroke, has a piston displacement of 82 cubic feet per minute. It is for use where a machine of slightly larger capacity than the 4¾ x 4-inch, 66-cubic-foot machine is required. It is equipped with a 4-cylinder, tractor-type Waukesha motor, and is available on broad-faced steel wheels, on steel wheels with rubber tires, on Ingersoll-Rand trailer mounting, on Ford or Chevrolet truck, or without running gear for mounting on skids, railway car, etc.

**The Continental Motors Corp.**, Muskegon, Mich., has placed into production a series of 6-cylinder overhead valve engines, known as the "R" series, intended exclusively for bus and truck service, and developing 87 horsepower at 2,400 r.p.m. This addition to the line of Red Seal engines now gives the manufacturers a complete line for commercial and automotive use.

**The American Institute of Steel Construction, Inc.**, 285 Madison Avenue, New York, has placed in active service a staff of ten district field engineers, in an effort to promote sound engineering practice and the welfare of the structural steel industry. These engineers will establish contact with engineers, architects, contractors, public officials and technical schools throughout the United States. A training school was opened in Cleveland, Ohio, on May 15, under the direction of Lee H. Miller, the Institute's Chief Engineer. There the engineers were thoroughly instructed in the aims and policies of the Institute before taking up work in the territories assigned them.

**The T. L. Smith Co.**, 1030 32nd Street, Milwaukee, Wis., has announced the appointment of M. B. Rider as factory representative for the eastern district. Mr. Rider has long been identified with the construction equipment industry, having previously been the eastern representative for the same company, as well as a sales representative for the Hubbard-Floyd Co., distributors of Smith pavers in the New York territory.

**The Cincinnati Car Co.**, Winton Place, Cincinnati, Ohio, builders of the "Cincinnati" types of diesel, gasoline,

electric and gas electric locomotives for industrial haulage, has appointed H. R. Sykes Manager of Sales of the Locomotive Division.

**The Trackson Co.**, 519 Clinton Street, Milwaukee, Wis., has announced that it is manufacturing Full-Crawlers for the McCormick-Deering Industrial tractor. A complete description and illustration of this new outfit will appear in the July issue of this magazine.

**Earl D. Stearns**, formerly of the Stearns Conveyor Corp., Cleveland, Ohio, has become associated with the Fairfield Engineering Co., Marion, Ohio, as Vice-president. The Fairfield Engineering Co. manufactures bucket elevators, drag conveyors, apron conveyors, belt conveyors, storage bins, skip hoists, feeders, portable conveyors, and railroad coal and ash handling equipment.

**The Mundy Sales Corp.**, 30 Church Street, New York, has announced the appointment of the following new exclusive distributors for Mundy hoists and Dobbie derrieks and the Schofield-Burkett excavator: E. F. Craven Co., Greensboro, N. C., for Eastern North Carolina; The Lone Star Road Machinery Co., Dallas, Texas, for Northeastern Texas; R. P. Sweeny Co., Greenville, S. C., for the entire state of South Carolina; The Nixon-Hasselle Co., Chattanooga, Tenn., for eastern Tennessee.

**The American Institute of Steel Construction, Inc.**, 285 Madison Avenue, New York, has announced the resignation of William H. Page, who has been in charge of the Bureau of Public Relations of the Institute. Mr. V. Gilmore Iden has been appointed as successor to Mr. Page. Mr. Iden has had extended newspaper and other editorial experience. He was, for six years, Managing Editor of the Journal of Commerce, of New York, and during the last year has been serving as one of the editors of the United States Daily in Washington, D. C., from which post he goes to the Institute. A. T. North, in charge of the Bureau of Architectural Relations of the American Institute of Steel Construction, Inc., has also resigned. Mr. F. H. Frankland has joined the Institute as Service Engineer for the new Engineering Service Bureau. Mr. Frankland, a Yale graduate of 1904, has engaged in structural engineering work in New Zealand, and in the United States. He was Managing Engineer for Waddell & Son, New York, and later for the Bancroft-Jones Corp., of Buffalo. He goes to the Institute staff from Dwight P. Robinson & Co., of New York, for which company he was supervising structural engineer, specializing in steel work.

**The American Institute of Quantity Surveyors**, 510 N. Dearborn Street, Chicago, Ill., will hold its Third Annual Convention at the Hotel Pennsylvania in New York, on June 25, 26 and 27. The members will gather to record their experiences of the past year and to discuss how they can become more useful to architects, builders, and their clients in solving the economic problems that confront both the buyer and seller of construction of buildings. Among the topics on which addresses will be made and discussed are: methods of surveying concrete, cut stone, marble, tiling, carpentry, millwork, plastering, and painting, estimating companies, pricing quantities, preliminary estimates, appraisals, uninvited bidders, unfair competitions, etc. To supplement the Third Annual Convention, a 2-day Construction Surveyors' Exposition will be held at the Hotel Commodore, on June 28 and 29.

**H. R. Sykes** has been appointed manager of sales of the Locomotive Division of the Cincinnati Car Co., Winton Place, Cincinnati, Ohio, manufacturers of gasoline, electric and gas electric locomotives for industrial haulage.

**DEVELOPEMENT REPORT**

EXP. NO. 7-3-24

PURPOSE To develop durable surface; utilizing sandy gravel.

DATE STARTED June 14, 1924

COMPLETED Oct. 17, 1925

MATERIALS USED "Tarvia-B" 13-18, "Tarvia-B" 18-25.

WHERE Thompson Road, Northchester County, E from Thornton Bridge.

METHODS EMPLOYED Double application 13-18 "B" on bladed road surface.  
 Section 1 - without covering on first application.  
 Section 2 - sanded 8 lbs. to square yard, 1/4 gal. on each application. Second application in square yard covered with 14 lbs. to local pit.  
 Sections 3 and 4 - experiment repeated with 18-25 "Tarvia-B".  
 Sections 5 and 6 - road surface treated with 1/4 gal. 13-18 yard local covered with 40 lbs. per sq. yd. immediately covered with .33 gal. per sq. yd. "Tarvia-B" 18-25.

RESULTS OBTAINED

**Make these records  
your information file—**

**F**OR over twenty years Tarvia field men have "sat in" with the highway engineers and road officials of the country when plans were up—and have assisted in the actual execution of the work.

Over twenty years of experience reported—recorded—and filed.

... and this valuable data is at your disposal through the Tarvia field man.

The *Barrett* Company

New York	Chicago	Minneapolis	Cleveland	Philadelphia	Boston
St. Louis	Salt Lake City	Baltimore	Toledo	Cincinnati	Bethlehem
Detroit	Milwaukee	Providence	Buffalo	Birmingham	Kansas City
Youngstown	Syracuse	Rochester	Columbus	Lebanon	

In Canada  
 THE BARRETT COMPANY, Limited, Montreal, Toronto, Winnipeg, Vancouver

## A New Cutter for Steel Cable

**A** CABLE cutter that introduces a new method of cutting steel cable, converting a tedious operation into a simple task, has been developed by the W. D. Starrett Metal Cutting Products Co., Alameda, Calif., and is distributed by Horace Hills, 533-9 Market St., San Francisco, Calif. With this cutter any grade or size of cable up to 1 inch in diameter



*The Starrett Cable Cutter*

can be cut, leaving both of the cut ends encased in a steel band by one operation. This operation takes less than 1 minute; one cut puts the seizing, or whips, on both ends at the same time.

The steel band used with the cable cutter is a thin sheet of pliable, but very tough, steel indented with a groove and lock seam at one end and is made in various lengths and sizes to fit any size cable. It acts as a whip, or seizing, as it not only clinches the lay of the strands in their proper position, preventing unraveling, but allows the cable to be passed through any socket or opening of its own size with

perfect ease, thus saving a great deal of time and trouble.

The steel band gives positive protection to the operator by eliminating all risk of injury to the hands from sharp and jagged wire ends. The cutter is endorsed by the Safety Department of the Industrial Accident Commission of California. The cutter adds to the utility of the cable in the ease, speed and safety with which repairs can be effected, reducing to a minimum the high cost of idle equipment while waiting for repairs.

The cutter is compact in size, being 6 inches high and 3 x 3 inches at the base. It weighs less than 7 pounds complete, takes up but little space and is easily carried from place to place. It is simple in operation, no skill being required to use it. The body is made of high-grade steel and will stand up under the most difficult work. The dies and cutting blade, which are replaceable, are made of a special steel and are tempered to insure long service and maximum efficiency. The one die cuts up to and including one-inch steel cable.



*Results of the Old and New Methods of Cutting Steel Cable*

## A Positive Oiling Triplex Road Pump

**P**OSITIVE lubrication of every bearing by means of a rotary, force feed pump, with only one moving part, is just one of the features of the 1928 model Triplex road



*The 1928 Model Barnes Triplex Road Pump with Positive Lubrication*

pump of The Barnes Manufacturing Co., 905 Main Street, Mansfield, Ohio. This pump has a forged steel crankshaft, roller bearings on all shafts, semi-elliptic springs and is mounted on a 3-point suspension truck. The pump has all steel gears and a quick detachable water end so that in case of freezing, the water end can be replaced at a nominal cost without disturbing the alignment of the pump or engine.

This Triplex pump is mounted on 3-point suspension, semi-elliptic spring supported trucks with auto-type front axle, giving a short turning radius. This mounting prevents distortion of the frame and consequent misalignment of pump and engine. The Standard steel wheels are of extra heavy construction with grooved tires 5 inches wide.

Main crank shaft, intermediate shaft, and pinion shaft run in Hyatt roller bearings of large capacity, thereby eliminating bearing adjustments, reducing friction and increasing the life and serviceability of the pump.

The water cylinders are cast separate from the crank or power end. Both castings are machined in fixtures so that interchangeability is assured. This new feature permits replacement of the water cylinders at a minimum cost in case of damage by freezing without disturbing the power end of the pump in any way.

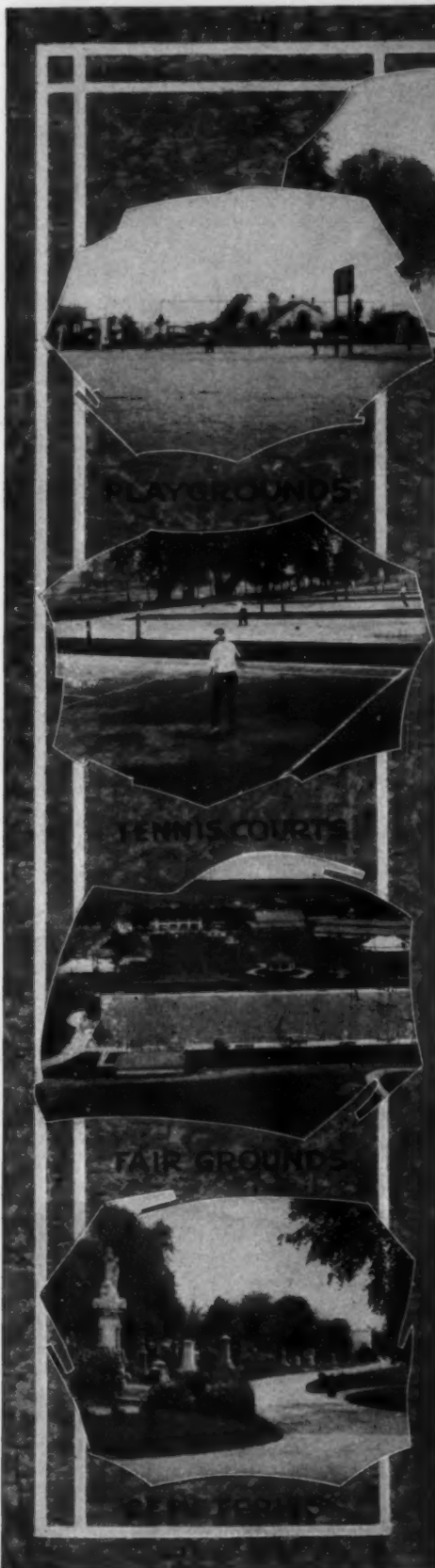
All gears and pinions are cut from steel blanks insuring great strength. The pinions are hardened by special heat treating to give the best wearing qualities. The crank shaft is a steel forging. It is of unusual strength in order to withstand the heavy strain resulting from high pumping pressures.

The plunger guide openings into the crank case are provided with simple self-adjusting auxiliary glands which prevent oil from leaking from the crank case and also prevent water from working along the plungers into the crank case. The valves are bronze, wing-type seating on tapered driven valve seats.

A "positive oiling" system is used on this pump, supplying all working parts by a combination of splash and force feed. The connecting rod bearings dip into the oil in the crank case on each revolution, and in addition all crank shaft bearings are sprayed and deluged with oil from above. All other working parts of the pump are supplied from the rotary oil pump that is operated by the main drive gear, stripping the oil from its teeth and forcing this oil under pressure to all reservoirs through a half-inch distributing pipe. This oiling system has only one moving part, a bronze pinion, engaging the teeth of the main drive gear.

Barnes Triplex pumps are built in several sizes to take care of any paving job, supplying from 60 to 150 gallons of water per minute at pressure up to 500 pounds.





PLAYGROUNDS

PARKS

ROADS

TENNIS COURTS

FAIR GROUNDS

## The Right Way to Solve the Dust Problem!



**"3-C" Calcium Chloride affords the surest, most economical means of dust control.**

Having the remarkable property of absorbing twice its own weight in water from the atmosphere, it keeps the road surface damp and dustless.

Easy to apply. An excellent binder for the road surface—materially reducing maintenance cost.

"3-C" now contains 77 to 80 per cent pure Calcium Chloride and therefore offers the utmost in value and efficiency.

For complete information and interesting data write for copy of our booklet on the subject of "Conquering Dust."

[

The use of "3-C" Calcium Chloride in curing concrete means a great saving in time and an improvement in quality.

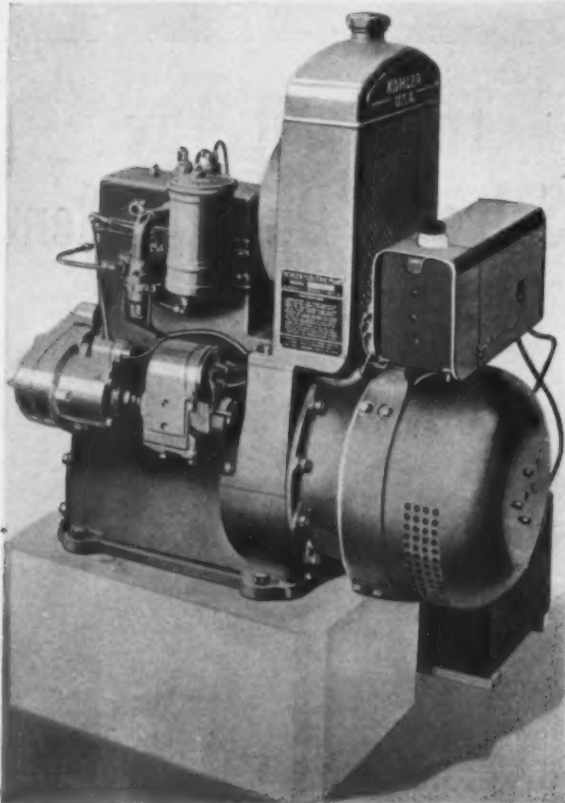
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**COLUMBIA CHEMICAL DIVISION**  
The Pittsburgh Plate Glass Co.  
BARBERTON, OHIO

## Electric Light for Excavating and Construction Camps

**A**N automatic electric light and power unit, Model-D, that generates 1500 watts, sufficient for sixty 25-watt lamps, or seven 200-watt floodlights, is one of several electric plants manufactured by the Kohler Co., Kohler, Wis. While the Model-D has been used by excavating and construction contractors for mounting on their equipment, the 2,000-watt 5,000-watt, and 10,000-watt plants are frequently used where more electric current is desired.

In addition to floodlighting for night construction or excavation, these plants furnish electric power to run the water pump.



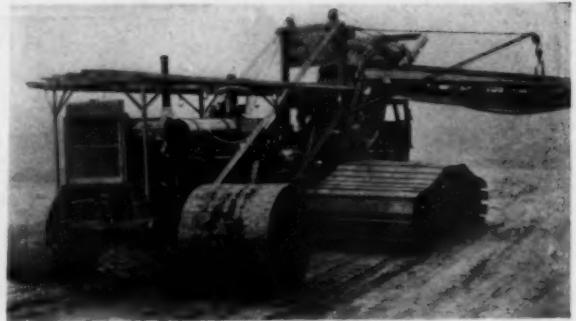
*A Complete Kohler Electric Plant for Construction Camps or for Lighting Equipment on Jobs*

operate electric drills, lathes and repair equipment, and air compressors and other tools and equipment economically and dependably. Frequently these plants are used also to light bunk houses, shacks, repair sheds, etc.

This Kohler plant adjusts itself to any load that is put on it. A governor acting upon the throttle valve of the engine supplies more fuel when the load is heavy and cuts the fuel down when the load is light, maintaining uniform voltage and steady lights at all times.

The switch patented by the manufacturers, starts and stops the plant automatically. All that is necessary is to turn on any electric light bulb or appliance and the plant starts automatically to generate the amount of current needed. It stops automatically when the last lamp is turned off. Thus part or all of the capacity of the plant is always conveniently available by merely turning it on.

The portability and rugged construction of the plant are



*A 1500-watt Kohler Electric Plant in the White Circle Pro-Buckeye Traction Ditcher Provides Light for Night Work on This*

features that make it desirable for contractors. There are no storage batteries to be carried around, and there is nothing fragile or delicate about it.

The engine of the 1500-watt plant is of the valve-in-head type, 4-cylinder, 4-cycle, 2-inch bore, 3-inch stroke, with a speed of 1000 r.p.m. The gas engine develops 3 horsepower. Lubrication is furnished by a pressure pump forcing strained oil to all the main bearings, and splash to other engine bearings. The engine is water cooled, each cylinder being entirely surrounded by water.

The crankshaft, camshaft, rocker arms and connecting rods are drop forged, of special steel, heat treated. The small battery of the automobile type is used for starting only, and is kept automatically charged. The fuel supply is contained in a vacuum tank on the plant. It is connected to a main supply tank, to draw fuel for the plant. The generator is a 4-pole compound wound, 110-volt D. C., generating 1500 watts.

The 2000-, 5000-, and 10,000-watt plants are constructed to follow the same general principles of the 1500-watt plant.

Where the automatic start and stop are not of particular advantage, the Kohler plants in the various sizes can be furnished without the automatic control, being started by a hand crank and stopped by pressing a stop button located on the plant or at a convenient place.

## Allied Construction Industries Committee Organized

**T**HE Allied Construction Industries Committee has been organized by leading builders from all parts of the country to correct improper practices and to stabilize credit conditions. The new body was formed during a session of the conference of the Associated General Contractors of America, in Washington, D. C., recently. George B. Walbridge, Detroit, Mich., is Chairman of the Committee.

The organization includes members of the executive committee of the Associated General Contractors of America and two representatives of each of the following trade organizations: United Roofing Contractors of America, National Association of Sheet Metal Contractors, Elevator Manufacturers' Association, Heating and Piping Contractors' National Association, International Association of Master Painters and Decorators of America, National Association of Building Trades Employers, Association of Electricians, National Association of Master Plumbers, International Cut Stone Contractors and Quarrymen's Association, National Association of Marble Dealers, Contracting Plasterers' International Association, and Tile and Metal Contractors' Association of America.

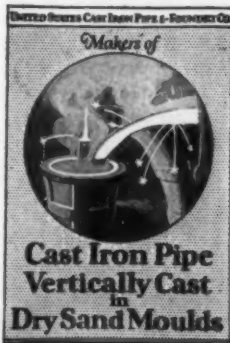
Foremost among the measures to be undertaken by the Committee is the formulation of rules of ethical practices to Government relationships between owners, architects, engineers, general contractors, subcontractors, material dealers and equipment manufacturers. Establishment of a rational credit system also will be undertaken as a primary move.



Part of 9 miles of 16" de  
Lavaud pipe, Class 100, re-  
cently laid in Tulsa, Oklahoma



## 5% extra carrying capacity with no extra COST



Much helpful data for the engineer  
is contained in the U. S. Cast Iron  
Pipe Handbook. Write for  
your copy now

**S**IZE for size, deLavaud pipe has a larger internal diameter than other cast iron pipe. The great strength of deLavaud pipe, the uniformity of the metal and its freedom from defects make this possible. And the extra carrying capacity of the larger diameter is further increased by the smooth interior surface of the pipe.

In the size of pipe shown above, this increase in internal diameter will result in approximately 5% greater carrying capacity . . . at no extra cost.

Whenever there is possibility of future growth in demand, the extra capacity of deLavaud pipe makes it an especially sound investment.

# United States Cast Iron Pipe and Foundry Company

Philadelphia: 1421 Chestnut St.  
Chicago: 122 So. Michigan Blvd.  
Birmingham: 1st Ave. & 20th St.  
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Cleveland: 1150 East 26th Street  
New York: 71 Broadway

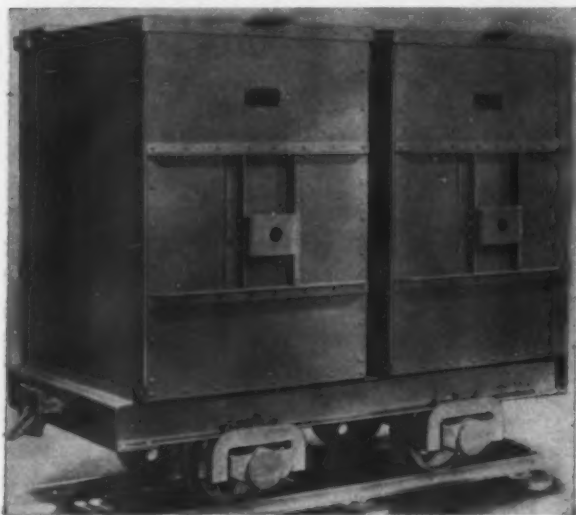
General Offices:  
**Burlington, New Jersey**

San Francisco: 3rd & Market Sts.  
Pittsburgh: 6th & Smithfield Sts.  
Dallas: Akard & Commerce Sts.  
Kansas City: 13th & Locust Sts.  
Minneapolis: 6th Street &  
Hennepin Avenue



## A New Batch Box Car and Batch Box

**D**ESIGNED especially for road work, The Lakewood Engineering Co., Cleveland, Ohio has developed a new batch box and batch box car. The car, No. 255-B, is designed with a carrying capacity amply large enough to handle two 48-cubic-foot batch boxes. The frame is of 6-inch ship channel, strongly braced and reinforced. Axles are of alloy



*The New Lakewood Batch Box Car and Batch Box for Road Work*

steel, heat treated, having a journal  $2\frac{1}{2} \times 6$  inches. Either the Lakewood cage roller bearing, or Hyatt bearing, is furnished. Complete spring draft rigging is standard equipment. Wheels are of cast steel, 14 inches in diameter.

The new type of Lakewood batch box incorporates the feature of adjustable trunnions, making it possible to alter the tipping axis of the box to allow for variations in sizes of batches that may be encountered on different jobs, this feature being in line with the growing practice of weighing materials. Another feature is the use of a chain in the bottom of the cement compartment which helps clean the cement from the compartment when the box is dumped. The 48-cubic-foot size of box has ample capacity to handle practically any batch now being used in the 27-E pavers. These boxes are also made in 41- and 45-cubic-foot capacities to meet any other requirements of mixing or paver capacity.

## A Mechanical Horizontal Hoist

**A** MECHANICAL horizontal hoist, operating on the worm and spur gear principle has been developed by The Van Dorn Iron Works Co., 2685 E. 79th Street, Cleveland, Ohio. This allows a greater proportion of truck capacity to the chassis than does a vertical hoist, saving the space occupied by a vertical hoist behind the cab, and folding compactly beneath the truck body.

The power developed by the motor and transmitted by a series of worm and spur gears in a 350 to 1 ratio, is employed for dumping the load. The hoist is bolted to the frame beneath the body by a 3-point suspension to allow for all weave and twist of the truck frame. An ample-sized roller chain connects the power take-off of the truck to the hoist.

The connection between the hoist and body is made by a link and lift-arm to give the highest dumping angle and to



*Close-up of a Van Dorn Horizontal Hoist*

allow a compact jack-knife folding of the arm under the frame when the body is in its lowered position. Besides these advantages, the arm and link arrangement forms a positive, rigid connection at all times, regardless of the dumping angle of the body. There is no danger of the body becoming over-balanced and tilting suddenly under the shifting of the load.

A convenient hand lever reached from the driver's seat controls the hoist. The hoist can be stopped at, locked, or lowered from any dumping angle, stopping automatically at a dumping angle of 45 degrees. The hoist is built in two sizes; the light-duty for 1 to 3-ton trucks, and the heavy-duty for  $3\frac{1}{2}$  to 9-ton trucks.

## A New Combination Welding and Cutting Torch

**S**PEEDING up welding and cutting operations and saving labor and gases are a few of the features of the new combination cutting and welding torch, Type-TI, of the Alexander Milburn Co., 1416-1428 W. Baltimore St., Baltimore, Md. With this torch it is not necessary to change the tip, since a convertible feature of the tip changes it from a cutting to a welding tip or vice versa by a turn of the tip.

In one position the gases are automatically passed through the preheating gas passages, while the high pressure oxygen is carried through the central hole for cutting. In the next position, made by a quarter turn of the tip, the cutting oxygen is cut off and the welding gases are conveyed through the central passage of the cutting tip, producing a welding flame.

In the new torch the Milburn principle of supermixing has been retained. Torch heads, valves, bases and other parts of bronze forgings, having a tensile strength of upwards of 5,000 pounds per square inch, assure lightness and durability of the



*The Newest Milburn Combination Cutting and Welding Torch*

new torch. The seamless high pressure tube is especially drawn with triple thick walls and is of nicked silver.

Flashback is eliminated even though the tip should be inserted in molten metal. The tips are constructed so that even when the tip may have outlived its usefulness as a cutting tip, it is still serviceable as a welding tip.



MINNESOTA STATE HIGHWAY No. 12

*treated with*

# Standard Asphalt Road Oil

Best results on first treatment are obtained by using  $\frac{1}{2}$  to 1 gallon of Standard Asphalt Road Oil No. 4 per square yard, varying the amount as the soil may demand.

For covering use 200 to 300 cubic yards of  $\frac{1}{2}$  inch gravel per mile for a 24 foot roadway.

Use a blade grader to uniformly spread the gravel covering and continue patrolling with grader until the surface of the road is seasoned by traffic.

*For further information write one of  
the following offices:*

## STANDARD OIL COMPANY

(INDIANA)

**General Offices: 910 S. Michigan Ave.**

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Joliet	South Bend	Mason City	Green Bay	Detroit	Minneapolis	St. Louis
Peoria	KANSAS	Sioux City	N. DAKOTA	Grand Rapids		
Quincy	Wichita		Minot Fargo	Saginaw		

206



*The New Model B-2 Speeder Full-Revolving Gasoline and Electric Excavator*

## A 1/2-Yard Excavator

**M**ODEL B-2, a fully convertible, full-revolving electric excavator of the Speeder Machinery Corp., Cedar Rapids, Iowa, has recently been put on the market. It is of 1/2-yard capacity and incorporates many improvements over the Model B-1 machine, which that company formerly manufactured.

A new reversible jawed clutch assembly is one of the features of this new unit. This clutch assembly retains all the desirable features of the sliding gear formerly used and has the added advantages of positive mesh of the gears at all times, and of making all vertical shafts removable and readily demountable, insuring ease in operation as well as long life.

Electric lights and starter are standard equipment. Two flood lights on the top of the cab furnish light for night work or travel by night. A dome light in the top of the cab illuminates the upper mechanism, and a spot light is used for a trouble light. The starter button is situated on the floor boards. The operator can shut off his motor while waiting for trucks and can start immediately by stepping on the starter button. The operator operates all the controls, gas and spark levers, light switch and starter button while seated in his seat near the front of the cab.

A Hercules Model-OX engine is used in the new unit. Other improvements include double-tread sprockets, and a large turntable greatly increased in weight.

## An Improved Motor Patrol

**M**ANY improvements mark the introduction of the new motor patrol of the Russell Grader Manufacturing Co., Minneapolis, Minn. These include: a compensating spring lift; main circle reinforced; large universal connection at the front of the drawbars which eliminates all play; grip lock nuts on all bolts 3/4- to 7/8-inch inclusive, that will not come loose from vibration; heavy 8-inch channel frame weighing 21 1/4 pound per foot; enclosed machine cut gears for the blade and scarifier lift; ball and socket connections, and moldboard reinforced

by two angle irons. This motor patrol is designed for use with the Caterpillar, McCormick-Deering, Cletrac and Fordson tractors.

The general construction is the same as the last year's model of this manufacturer. The improvements have been added to insure efficiency and low up-keep cost, as well as durability and maximum service.

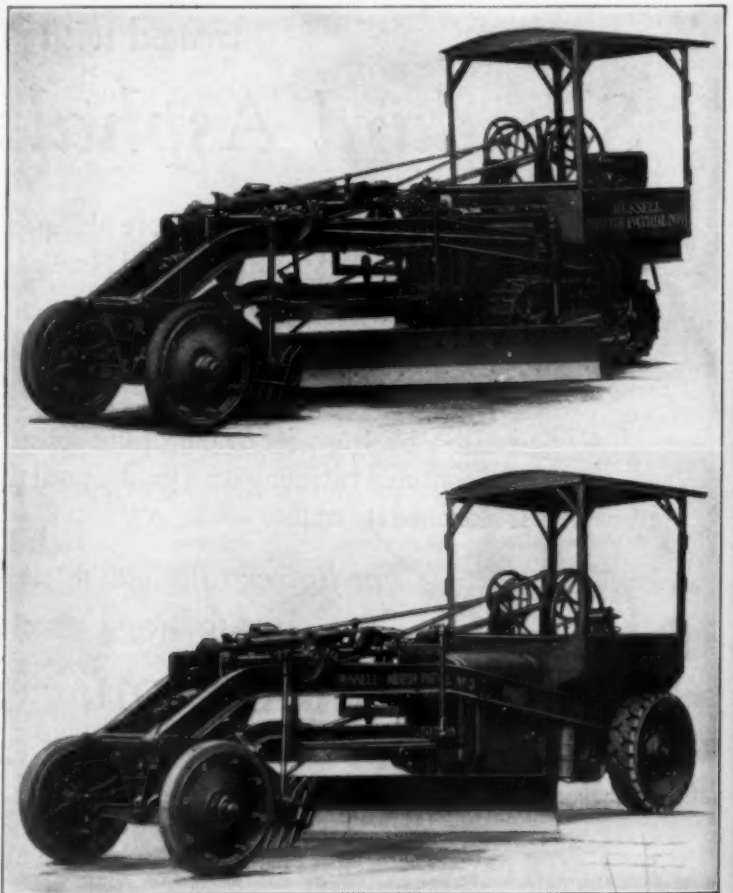
The scarifier is independently adjustable and completely controlled from the operator's platform. The front wheels are 32 x 5 inches wide, with extra wide axle to accommodate the larger wheels.

There are bronz bushings and bronze collars for worm shafts, a take-up bearing in the forward lifting arm bracket, and the center shaft operated by a worm and gear through a rack and pinion. The circle play is eliminated by means of a screw clamp in the circle brackets. The machined worm gear steering control is said to steer as easily as a truck. Alemite lubrication is used throughout. Timken bearings are used in the front axle. A side crank for the tractor is furnished as regular equipment, and the steel cab may be entirely enclosed, if desired by the purchaser.

This motor patrol may be made an all-year round machine by the addition of a Russell snow plow attachment.

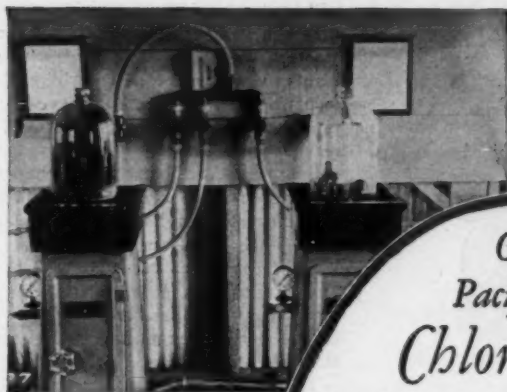
The weight of the No. 4 patrol is 12,500 pounds with tractor, and scarifier attachment, and the weight of the No. 3 complete with tractor and scarifier attachment is 12,550 pounds.

This new model Russell motor patrol introduces a great improvement in quality and efficiency, and should prove a popular piece of road equipment for contractors and road builders.



*Above, The Russell Motor Patrol No. 4 Powered with a 2-Ton Caterpillar Tractor, and Below, The No. 3 Model Powered with a 10-20 McCormick-Deering Tractor*





The W&T Vacuum Solution Feed Chlorinator is used by the Water Department of San Diego, Cal.

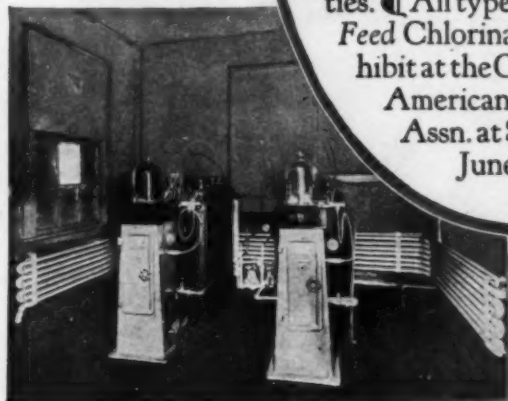


The East Bay Water Company uses W&T Solution Feed Chlorinators at the Upper San Leandro Filter Plant.

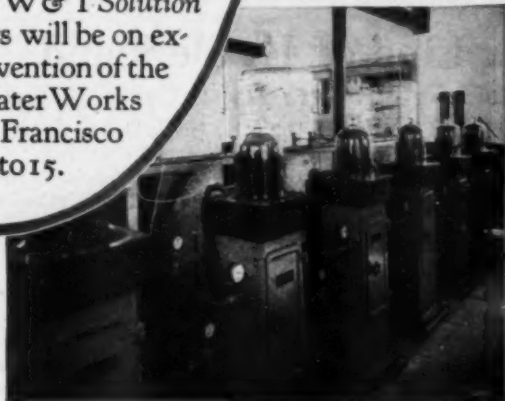
## On the Pacific Coast Chlorination

has become standard practice for the Sterilization of Water—the Sanitation of Swimming Pools—the Disinfection of Sewage—and for many other purposes—largely because of the dependable accuracy and sturdy reliability of W&T Solution Feed Chlorinators. 85% of all Chlorinator Installations are Solution Feed. They have greater flexibility—longer life—more positive control—better distribution and freedom from operating difficulties. All types of W&T Solution Feed Chlorinators will be on exhibit at the Convention of the American Water Works Assn. at San Francisco June 11 to 15.

The Tacoma Water Works also finds the W&T Vacuum Solution Feed Chlorinator to be a dependable—positive apparatus.



The Los Angeles Water Department makes extensive use of the W&T Automatic Vacuum Solution Feed Chlorinator.



"The only safe water is a sterilized water"



# WALLACE & TIERNAN

COMPANY, INCORPORATED

Manufacturers of Chlorine Control Apparatus

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SA 12



*The New Model-AA Ford Truck Equipped with a Wood Power-Operated Hoist*

## Hydraulic Hoist for New Ford Chassis

**C**ONTRACTORS may now secure the Model AA Ford chassis equipped with a power-operated hydraulic hoist made by the Wood Hydraulic Hoist & Body Co., Detroit, Mich. The hoist used is the new G-1 type, which dumps its load in from 4 to 6 seconds and has a dumping angle of 60 degrees. The mounting height is low and the short overhang of the body back of the hinge provides for maximum ground clearance, allowing free discharge of the load when dumping.

With this hoist either the regulation steel dump body, the steel garbage body, the J-1 all-purpose body or Type-C special coal body may be used, depending on the type of service.

## A Line of Loaders and Shovels

**A** LINE of loaders and shovels has been added to the present line of Trackson Full-Crawlers of the Trackson Co., 519 Clinton Street, Milwaukee, Wis. Outstanding in this new additional equipment are the Trackson High-lift loader and Low-lift shovel. The high quality of materials and workmanship in these units assure them of maximum strength and durability.

The shovel with a 3½-foot lift has a wide field of activity, replacing from four to ten men and as many as four teams on excavating jobs, building grades, sub-grading, filling ditches and bridge approaches, digging trenches, etc. It is also well adapted for backfilling and bulldozing, and may be used for leveling or pushing materials over embankments, and will handle



*The Trackson Low-lift Shovel for Excavating, Backfilling and Carrying Materials*

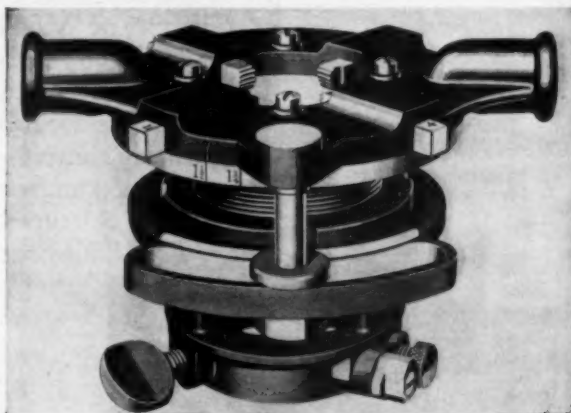
from 80 to 160 yards of material per day.

The High-lift loader with a 7-foot lift will load a truck or wagon in a few minutes' time, and is especially suited for contractors, quarries, coal yards, industrial plants, water-works and garbage departments, etc. Both machines have been designed to withstand long hours and days of constant service.

Simplicity of operation is one of the features of these machines. Cable tighteners insure even hoisting of the bucket. The clutch is of the multiple disc type with hardened and ground saw steel discs, and anti-friction bearings and an extra long pinion shaft bushing of highest grade bronze increase the machine's efficiency and strength.

The buckets are adapted to mounting on either wheel or crawler-equipped Fordsons, the Trackson Full-Crawlers greatly adding to the efficiency of either loader or shovel

for work in difficult ground conditions such as soft, loose soil, mud or swamp, sand gravel, snow, clay, etc. The outfit thus equipped has a sure footing, can turn in its own length, and will deliver maximum power at the drawbar.



*The New Beaver Self-Contained and Adjustable 1 to 2-inch Die Stock*

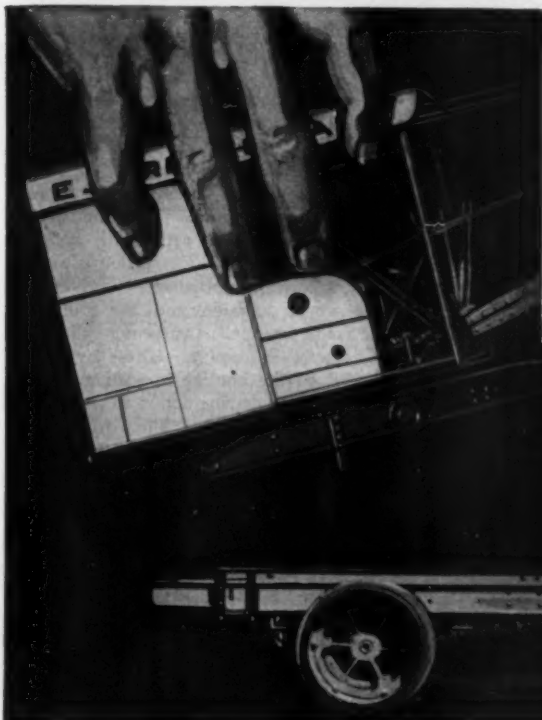
## Two New Die Stocks

**T**WO new self-contained and adjustable 1- to 2-inch die stocks have been announced by the Borden Co., Warren, Ohio, in the No. 11 Beaver plain tool and the No. 11-A Beaver ratchet which supersede the old No. 25 Beaver plain tool and No. 26 Beaver ratchet, respectively.

In these new Beavers one set of dies is quickly set to thread 1, 1¼, 1½ or 2 inches without changing dies. The dies cannot become lost or mislaid, because they are always in the tool ready to use. The dies are quickly adjusted to thread under or over standard without affecting the length of the thread. Either the No. 11 or 11-A will cut threads on any kind of pipe, including brass pipe. The threading dies in these new tools are made of high grade alloy steel specially treated with respect to hardening and tempering and thus give much longer threading life.

On these new tools the die head and threaded barrel are two separate parts, so that when repairs are required only one part need be bought. The work holder or pipe gripping device is of new design and centers the pipe accurately. Two knurled screws are quickly set and hold firmly to pipe size, leaving only the thumb screw to be tightened after the die stock is placed on the pipe.

## MOUNT A UNIVERSAL ON YOUR USED MOTOR TRUCK



A USED motor truck that has lived its life on the job you bought it for—or a truck that is not earning you money right now—these make a good mounting for a Universal Crane, which will again turn your used truck into a profit-earning unit, only more so than ever before.

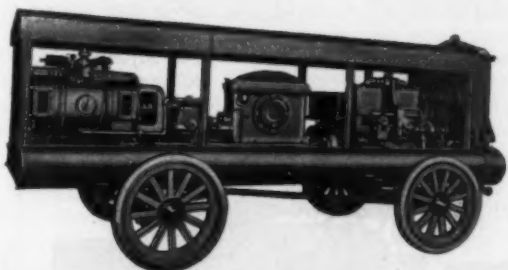
Maybe you have such a used 5-ton or heavier truck—maybe you know where you can get one cheap—mount a Universal on it and let it earn \$50 to \$100 a day, and often more than this, on jobs such as digging, material handling, steel erecting and a hundred and one others shown in bulletin No. 36-A.

If you haven't a used truck available, we can furnish a suitable truck mounting, giving you a unit that earns \$50 to \$100 a day and often more—Bulletin No. 36-A gives further details—Send for it.

**THE UNIVERSAL CRANE CO.**

984 Swetland Bldg.  
Cleveland, Ohio

## THE RIGHT COMPRESSOR FOR ALL KINDS OF PNEUMATIC TOOL WORK



**READY FOR EVERY JOB---**

HORIZONTAL TYPE—DOUBLE  
ACTING—SLOW SPEED—  
STURDY AND RELIABLE—  
LONG LIFE—LOW UPKEEP.

### THE TRAYLOR 12 in. x 10 in. PORTABLE COMPRESSOR

Will operate five rock drills, fourteen chipping hammers,  
or other pneumatic tools in proportion

*Send the Coupon—Now!*

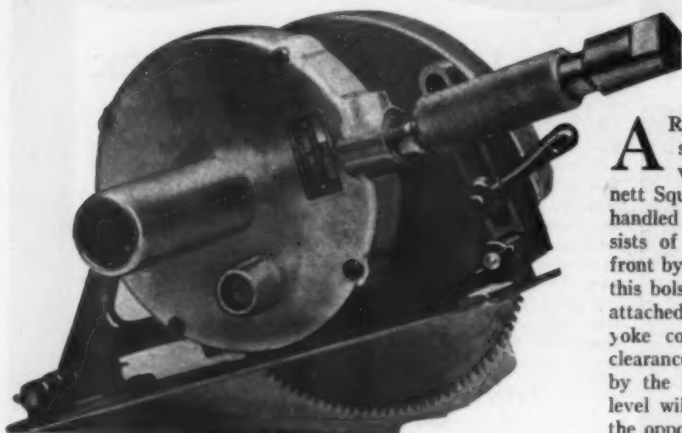
Also write us for information on  
the "Cement-Gun" and "Gunite."

**CEMENT-GUN COMPANY, Inc.**  
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Denver      Salt Lake City  
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Allentown, Pa.  
Please send full information on the TRAYLOR  
PORTABLE COMPRESSOR. ☐  
I would like to have your representative call. ☐  
Name .....  
Address .....  
City ..... State.....





*The Tousley Air-operated Saw*

## A Turbine Air Adjustable Saw

**A** LIGHT, portable machine furnished with an 8-inch circular saw that is easily adjustable to any cut, from  $\frac{3}{8}$ -inch to 2 inches in depth, has been put on the market by The Tousley Tool Co., 1965 East 66th Street, Cleveland, Ohio. This new machine will do the work of many hand saws, particularly on rush jobs such as making wooden forms for concrete construction out on the job.

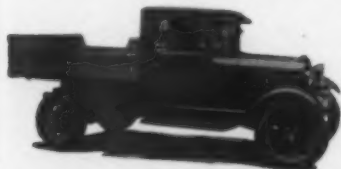
This tool is easily handled anywhere, because of its light weight, and its fast speed makes it a time saver. It can be used with a routing cutter. It is easily portable and adjustable to the depth to be ground, and it cannot go below that depth, thus preventing digging in and jumping of the tool. It is driven by a turbine air motor that consists of a one-piece alloy forging weighing less than one-half pound, that develops a cutting speed of 3600 r.p.m.

## A New Hand Hoist and Dump Body

**A** NEW  $1\frac{1}{2}$ -ton dump body and hand hoist, No. 15, has been developed by The Marion Steel Body Co., Marion, Ohio, to be used on the new Ford truck "AA." The hoist has been made strong and large to comply with the new Ford's additional capacity. The hoisting mechanism has been specially designed to give great ease of operation—fifteen turns of the crank will raise the body to a 45-degree angle. A pawl arrangement is located on the crank support to hold the body in a lowered or raised position.

The hoisting gears and mechanism are enclosed in a steel case and are dust proof. When the body is in a lowered or running position, no stones can get to the gears. A double lifting arm, in place of a single one, is used.

The new Marion understructure has been doubled in strength for the full  $1\frac{1}{2}$ -yard capacity of the new Ford. All body seams have been welded. The body is substantially reinforced and built close to the cab. The sill runs the full length of the frame, enabling the dump body to carry the load and distribute it over all of the available frame space.



*The Marion  $1\frac{1}{2}$ -Ton Dump Body with New Ford Truck Model "AA"*

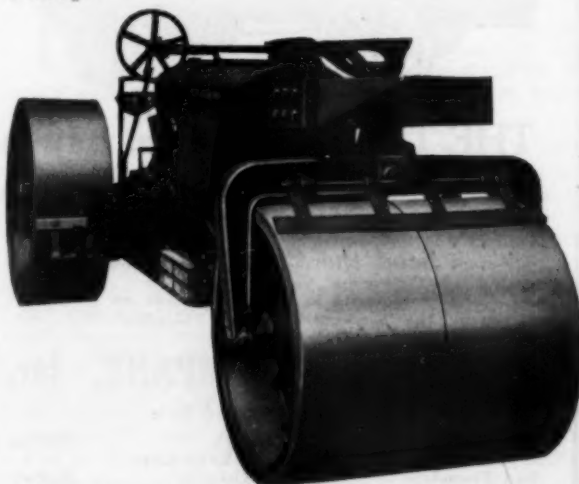
## A Sturdy, Flexible Road Roller

**A** ROAD roller for use where high compression, regularity, sturdiness, and flexibility are requisites, has been developed by The Good Roads Machinery Co., Inc., Kennett Square, Pa. This Senior roller turns easily and is readily handled in close quarters. The frame of the Senior roller consists of two sections of heavy ship-channel, fastened at the front by a heavy cast bolster. The king pin extends up through this bolster and around the yoke pin. The steering segment is attached to the top of the king pin, while at the bottom the yoke completely spans the split front rolls, with sufficient clearance to allow necessary play. A rolling section is allowed by the insertion of the yoke pin, so that deviation in road level will not affect the proper functioning of the roller. At the opposite end of the frame channels, two heavy split plates completely encircle the rear axle housing. These are bolted on the frame and adjusted on the housing in such manner as to allow as near 100 per cent free driving action as possible.

The two rolls comprising the front roll allow free turning and easy handling in close quarters. The large diameter of the front rolls assures even compression, as they permit the mounting of many obstructions that smaller diameter rolls could not surmount. The rear rolls are proportionately large in their diameter, and are carried on a dead axle fastened to the frame.

The roller is steered by means of a special cut steel worm gear and a cut worm, operated by a hand wheel and shaft. The tractor is mounted in the frame by 3-point suspension, fastened in front to the frame by a trunnion pin and mounted in the rear axle through a gear reduction, driving on both sides to the rear on a single pedestal. The drive is from the regular tractor dead axle on which the rear rolls are fastened, allowing considerable increase in power, and at the same time permitting the tractor mechanism and transmission to function in the usual manner without any disturbance of parts or gears. Alemite lubrication is standard equipment.

A scarifier, consisting of a heavy block and seven teeth, 36 inches long, pointed at both ends and reversible, operated by a hand wheel through worm and worm gear, is attachable to the rear of the roller. A leveler, attached beneath the roller and directly below the tractor, extends forward approximately 18 inches in front of the front rolls. It is adjustable from both sides by handwheel, shaft, worm, and worm gear for raising and lowering, and the telescopic side arms permit an angular adjustment when required. The power is a 10-20 McCormick-Deering.



*The Good Roads Senior Roller with McCormick-Deering Tractor*

# Newark

REINFORCED CONCRETE PIPE  
*"It makes a better joint"*

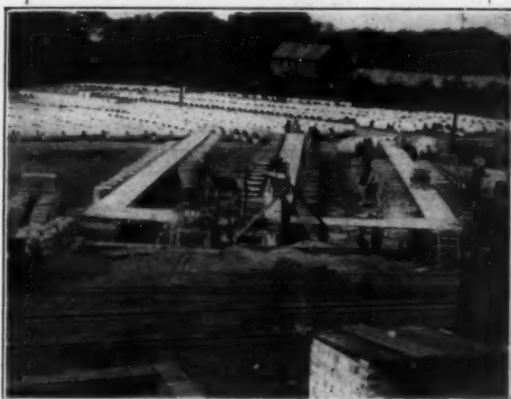
Laid in minimum time—

At minimum expense—

With minimum effort—

This pipe, when laid, has a minimum resistance to flow, because the inside of each joint is so smooth!

Contractors and engineers all heartily endorse it!

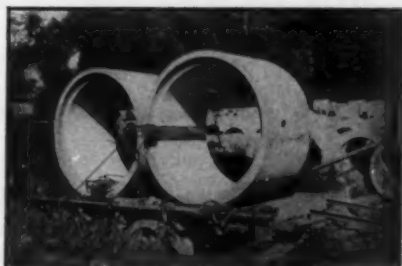


Write us for sketches showing types of joints furnished  
(Send a post-card)

## NEWARK CONCRETE PIPE COMPANY

462 Broad St.

Newark, New Jersey



# Is your water supply too costly?



Don't let inefficient water supply absorb hard-earned profits. Investigate Barnes Triplex Road Pump ability.

Built for high pressures, Barnes Pumps always give a steady volume of water for all operations. Distance and elevation are no barrier to Barnes consistent performance.

Many contractors have turned loss into profit by replacing inefficient pumps with the Barnes. All of these features are found only on Barnes Pumps:

- 1—Most simple, self-oiling system—one-moving-part rotary pump
- 2—All-steel gears
- 3—Forged crankshaft—not cast
- 4—Three-point suspension truck, spring-mounted
- 5—Roller bearings on all shafts, including crankshaft
- 6—Water cylinders detachable from power end
- 7—Flexible coupling between pump and engine
- 8—Rubber-tired roller-bearing wheels, interchangeable with standard steel wheels

Capacity 80-100-125-150 gallons per minute pressures up to 500 pounds

**THE BARNES MANUFACTURING CO.**  
905 Main St., Mansfield, Ohio

## BARNES PUMPS

Mail This Coupon for Complete Specifications

The Barnes Manufacturing Co.,  
905 Main St., Mansfield, Ohio

Please send me complete description covering Barnes Road Pumps.

Name .....

Address .....

City ..... State.....



*A Coleman 4-wheel Drive Truck Successfully Negotiating a 52 Per Cent Grade with a Load of 100 Sacks of Cement*

## A 4-Wheel Drive Truck

**D**ESIGNED primarily to operate economically under adverse conditions of deep snow, mud, sand, steep hills, and slippery roads, a 4-wheel drive, 5-ton truck, Model X-100, has been developed by the Coleman Motors Corp., 314-316 Eye Street, N. E., Washington, D. C. The low gear ratio makes it possible for the driver to proceed through such conditions slowly without abusing the truck or its mechanism.

The front wheel design on this truck makes it mechanically possible to use the very low gear reductions which are essential for a full development of 4-wheel drive mobility. The truck is easy to handle and has a wide choice of gear ratios.

The front axle is placed under the frame at a point that will give an equal distribution of weight upon both axles when the truck is loaded to capacity, adding tractive ability and tire life. The draw bar pull makes the truck suited to all forms of trailer and semi-trailer installation.

\* The Buda Model BUS 6-cylinder engine has a 4-inch bore and 5 1/8-inch stroke, developing 78 horsepower. It has a large diameter crank shaft, giving a smooth performance. The positive braking mechanism, effective upon all four wheels, provides safety on the congested highway. The eight speeds forward permit the low gear ratios necessary for "off the road" service under extremely difficult conditions.

Standard unit sub-assemblies are used wherever possible, Buda motors, Fuller transmissions, Ross steering gears, and Spicer universal joints being used.

The steering pivot bearings on the front wheel are standard Timken roller bearings and are adjusted from the outside by a simple set screw and wedge device. The wheel bearings are heavy-duty Bower roller bearings and are provided with the usual screw nut adjustment.

The wheel and pivot bearings are lubricated by readily accessible Alemite connections. The four large bearings of the universal joint are lubricated by four Alemite fittings located on the outside rim of the wheel.

The load centers and the pivot centers of the wheels correspond and, when fully loaded and in bad roads, the truck steers easily. The turning radius is the same as that of an ordinary truck.

The Coleman auxiliary transmission is different in design from the usual unit of this type. Engine power is transmitted to the two driving shafts through a train of large wide-faced gears that seldom require adjustment and that possess strength and durability. A 2-speed shift with a neutral position is provided. The two ranges of speeds are required in a 4-wheel drive truck for economical operation. One of these ranges is chosen to give normal gear ratios for hard road service and does

not require that the motor be run at abnormal and excessive speeds. The second and lower range is for "off the road" service where the maximum pulling power is required. The neutral position is designed for the attachment of a winch or other auxiliary equipment and permits the use of the four speeds and reverse of the regular transmission in operating such equipment.

## An Economy Wire Tie

**T**HE Miller pre-made form tie for use in building forms for concrete walls, the use of which enables the contractor to produce strong and accurate forms, and save time and money, has been developed by Grannis, Rich & Co., 4000 Whiteside Avenue, Los Angeles, Calif.

According to the manufacturer, the contractor saves about three times the amount he pays for the ties. All ties for the same thickness of wall are exactly alike, and they cause the wall to be self aligning. When the concrete is being poured, each tie immediately takes its share of the burden. The ties will build all kinds of form from the smallest structure to bridge abutments and piers.

The use of these ties saves the lumber in vertical studs, which is one-third the lumber required to build forms. The ties save cutting in and fishing out spreaders. They save twisting by hand, time in erecting and wrecking, and drawing nails and splitting boards. In a recent construction job, a saving of \$53.00 was effected in labor alone, by the use of the Miller ties. The labor in building 200 feet of 8-inch wall 10 feet high amounted to \$77.00, while the labor on the same number of feet on the same job by the same men, using Miller ties, amounted to \$24.00.



*Kelly-Springfield Roller Built to Order for the City of Pasadena, Calif., Several Years Ago. This Roller Was Partly Wrecked by a Fall Over a Cliff, but Was Repaired and Is Now Shown Compacting the Subgrade Prior to Concrete Paving in Front of the New Pasadena City Hall*

## Cascade Tunnel Opened

**O**N May 1, 1928, the fifth largest tunnel in the world, the Cascade Tunnel of the Great Northern Railway, was holed through by a dynamite blast set off by electricity by President Coolidge from Washington. This tunnel which was described by R. F. Hoffmark, General Superintendent, A. Guthrie & Co., Inc., Portland, Ore., in the January, 1928, issue of *CONTRACTORS AND ENGINEERS MONTHLY*, is being built at a cost of \$16,000,000. Electrification and line changes will bring the total expenditure to \$25,000,000. Next December, three years after construction was begun, it is planned to run the first train through the Cascade Tunnel for the Great Northern Railway.



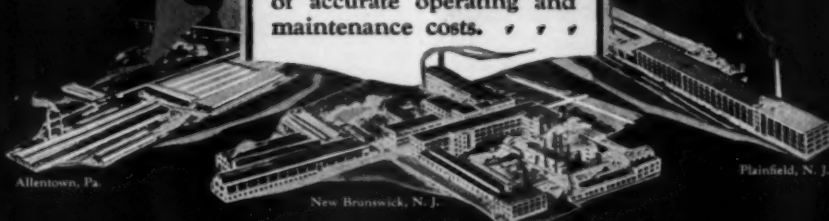
# Twenty-Eight Years of Consistent Value

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# Mack

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## The Star Power Shovel

**Grader - Shovel - Ditcher - Backfiller - Crane**



**Only STAR**

**Gives You the Advantages of  
the Patented Telescoping Handle!**

Full swing and the exclusive "turtle-head" beam make the Star a truly efficient many-purpose machine.

Close-quarter jobs handled with dexterity. 11 feet of horizontal crowd. Revolves completely in 22-foot circle.

Curved crowding rack makes it possible to handle bank work with skimmer scoop. Dumps 17 feet in clear.

**One-man control. All controls at operator's seat.**  
Convertible into sub-digger or crane.

*Write for complete information  
about this "different" shovel.*

**The Star Drilling Machine Co.**  
**AKRON, OHIO**

**BRANCHES:**

Long Beach, Calif.; Chanute, Kan.; Portland, Ore.; Wichita Falls, Tex.

The Star Drilling Machine Co.  
505 Washington St., Akron, Ohio

Send catalog and complete information about the Star Power Shovel.

Name .....

Address .....

CEM-638



*The New Bay City Convertible Excavator*

## A Full-Revolving, Convertible Excavator

A  $\frac{3}{4}$ -YARD full-revolving, convertible shovel, crane or trencher has just been announced by the Bay City Dredge Works, Bay City, Mich. It is known as the Type-R, and is a sturdy, compact machine. It is full crawler mounted with long and heavy crawlers with extra width tread shoes. The crawlers are of standard Bay City design with tread rollers enclosed on top and both sides to keep out the dirt, and have self-cleaning treads. The Type-R is one-man operated, and is provided with either gasoline or electric power. A fully enclosed steel cab with doors and windows is standard equipment.

There are several outstanding features in this new unit. It has a compact machinery arrangement with easily accessible parts. The distance from the base of the boom to the king-pin or center of rotation is only 30 inches, making possible great stability of the machine and permitting the lifting of heavier loads and greater operating radius.

The new crawler steering mechanism permits the quick and easy steering or turning of the machine by the operator without leaving his lever position or making any adjustments or changes in connection with the propelling mechanism, without stopping to shift the jaw clutches. The machine can be turned in any direction while traveling ahead at full speed without any pause in the forward motion.

The machine table revolves on an unusually large diameter heavy cast circle mounted on the car body with large diameter rollers. This  $6\frac{1}{2}$ -foot-diameter circle extends a little beyond the width of the car body, giving the machine stability and eliminating all tipping or rocking on the center port, and permitting more accurate cutting on a fine grade.

The short tail swing permits operation in crowded quarters.

The lubrication of all parts located under the revolving base is accomplished by the operator without bending over or getting under the machine. A battery of 12 Zerk-Alemite connections is located at the front of the main car body under a protecting plate, so that the operator can lubricate all parts under the revolving base from the one location.

The approximate operating weight is 26 tons. Standard equipment includes electric starting equipment for the engine, Timken roller bearings on high speed shafts, a  $5\frac{1}{2}$  x 7-inch 4-cylinder Climax engine operated at a speed developing 62 horsepower, and drums operated by E-Z control clutches with all operating levers in a convenient bank in front of the operator.

The following attachments are available for the Type-R: standard  $\frac{3}{4}$ -yard shovel dipper with manganese steel detachable and reversible teeth;  $\frac{3}{4}$ -yard all manganese rock dipper, heavy Missabbe type, with reversible teeth; crane boom in lengths of 35, 40 or 45 feet to handle loads up to 10 tons and crane buckets ranging from  $\frac{1}{2}$ - to  $\frac{3}{4}$ -cubic-yard clamshells, and  $\frac{3}{4}$ - to 1-cubic-yard draglines; trench boom and scoop with trencher buckets ranging from 18 to 42 inches in width with a maximum digging depth of 20 feet.

## A New 4-Wheel Trailer

A ROLLER-TYPE fifth wheel circle that permits easy operation and does away with weaving and snaking on the road; a sturdy drawbar attached to the outside corners of the forward end of the frame; automatic braking that prevents the trailer overriding the pulling unit; and safety chains that combine double safety with ease and convenience of handling, are the outstanding features of the new 4-wheel trailer of the Lapeer Trailer Corporation, Lapeer, Mich.

A stop of rugged construction on the front of the frame prevents the front wheels of the trailer from being turned beyond the proper angle. The drawbar yoke is attached to the outside corners of the frame in this trailer. The corner castings used in connection with the frame and the gusset plates make the corners an integral construction, sufficiently strong to stand abuse. In the braking system, when the trailer overrides the tractor, the drawbar pole is pushed back against the lever on the front end of the trailer frame.

The chains on this trailer are furnished as part of the trailer and pintle hook. This arrangement eliminates the necessity of crossing the safety chains in order to turn the truck with relation to the trailer. The longer portions of the safety chains are connected to the outside of the front end of the trailer frame and follow the V-shaped drawbar to its forward end where they pass through eyes.

The short chains furnished with the pintle hook may easily be hooked up with the long chains, on the draw-bar. Each chain is of sufficient strength to pull the trailer and load independently of the other chain or draw-bar. Convenient arrangement is provided for hooking the short chains on the pintle hook up out of the way when the truck is disconnected from the trailer. This pintle hook is a standard S.A.E. forging with suitable spring for cushioning the draw-bar pull built into it.



*A Scene on Route 17 of the New Jersey Highway System, Showing a Freuhauf Trailer Owned by the Mal Par Trucking Corp., of Montclair, N. J., Moving a Keystone Excavator Owned by A. K. Moore, of Belleville, N. J., from a State Highway Bridge Job in Paramus, N. J., to the Contractors' Yard. The Excavator Had Just Loaded Itself on the Truck When This Photograph Was Taken*

# American Steel & Wire Company's

## WIRE FABRIC

"The Steel Backbone for Concrete"



## Making City Street and Country Highway Permanent

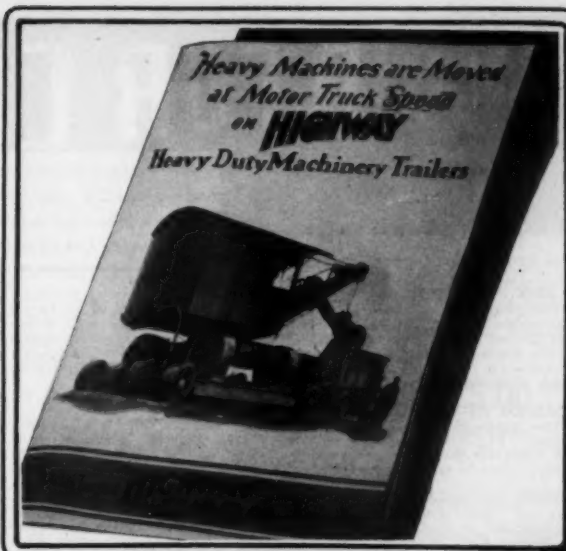
**T**O reinforce concrete roads with Wire Fabric makes them permanent and is a proven economy. This fact is conclusively brought out in the report of the Highway Research Board, National Research Council.

Made of cold drawn high tensile strength steel, Wire Fabric has proved itself the perfect slab reinforcement. It gives the most effective distribution of steel—the closely spaced wires insuring greatest binding strength, holding the slab together as a solid unit and preventing the development of cracks.

Wire Fabric means permanent reinforcement—longer concrete life—lower maintenance costs. It is furnished in sheets cut to definite size which are easily handled and placed.

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CINCINNATI.....Union Trust Building	PHILADELPHIA.....Widener Building
MINNEAPOLIS—ST. PAUL.....101 Marietta Street	ATLANTA.....101 Marietta Street
St. Louis.....406 Olive Street	WORCESTER.....94 Grove Street
KANSAS CITY.....417 Grand Avenue	BALTIMORE.....32 So. Charles Street
OKLAHOMA CITY.....First Nat'l Bank Bldg.	BUFFALO.....670 Elliott Street
BIRMINGHAM.....Brown-Marx Bldg.	WILKES-BARRE.....Miners Bank Bldg.
MEMPHIS.....Union and Planters Bank Bldg.	*SAN FRANCISCO.....Rum Bldg.
DALLAS.....Praetorian Building	*LOS ANGELES.....2087 E. Slauson Ave.
DENVER.....First National Bank Bldg.	*PORTLAND.....777 Nicolai Street
SALT LAKE CITY.....Walker Bank Bldg.	*SEATTLE.....4th Ave. So. & Comm. St.
	*United States Steel Products Company.



## If You Have Heavy Machines to Move You Should Have This Catalog

You will find the solution to the problem of economical transportation of your machinery, and other heavy loads, contained in the booklet illustrated above.

It shows the several types of Highway Machinery Trailers with construction details and specifications—straight frame of 10 to 40 tons capacities—drop frame of 1½ to 75 tons capacities—drop frame semi-trailers, knuckle steer four-wheelers, and special Highway Machinery Trailers. Among these several types and with the wide range of capacities you will surely find the trailer that is exactly suited to your requirements.

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Please send us a copy of your booklet, "Heavy Machines Are Moved at Motor Truck Speed on Highway Heavy-Duty Machinery Trailers." We understand this request does not obligate us in the least.

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# AN AID FOR CONTRACTORS

These especially selected catalogs and pamphlets of value to contractors are for free distribution. You will find it worth while to check these lists each month and write for the catalogs you need.

## A NEW CONCRETE CURING METHOD

The Hunt Process of curing concrete, which is to be used in curing approximately 1,500,000 square feet of the main canal in a huge irrigation project in the State of Washington for the Bureau of Reclamation of the United States Department of the Interior, is described completely in literature which the Everlasting Paint & Sales Co., 1110 Board of Trade Building, Los Angeles, Calif., will send on request.

## LEANING WHEEL GRADERS

The Austin-Western Road Machinery Co., 400 No. Michigan Avenue, Chicago, Ill., has just issued a folder "Trail Blazers" which describes and illustrates that company's complete line of leaning wheel graders with a size and style to meet every road maintenance problem.

## A NEW COMBINATION WELDING AND CUTTING TORCH

A new combination cutting and welding torch, Type-TI, that speeds up welding and cutting operations, saves labor and gases, and that has a tip that is convertible from a cutting to a welding tip or vice versa, by a turn of the tip, is described in literature of the Alexander Milburn Co., 1416-1428 W. Baltimore St., Baltimore, Md.

## A 1/4-YARD EXCAVATOR

Model B-2, a fully convertible, full-revolving, 1/4-yard excavator, powered by a Hercules Model-ON engine, and incorporating many new features, is described in a new catalog of the Speeder Machinery Corp., Cedar Rapids, Iowa.

## A 4-WHEEL DRIVE, 4-WHEEL STEER TRACTOR

Power, operating costs, simplicity and ability to perform under adverse conditions are the outstanding features of a 4-wheel drive, 4-wheel steer tractor, which is described in literature of the Atlas Engineering Co., Clintonville, Wis.

## MAKING HIGHWAYS PERMANENT

Making city concrete streets and country highways permanent by reinforcing them with wire fabric is described in literature of the American Steel & Wire Co., 208 S. La Salle St., Chicago, Ill.

## PORTABLE COMPRESSORS THAT SAVE TIME AND MONEY

The Curtis portable compressor that does the work of 6 to 8 men and also saves fuel, labor and investment, is described in circulars of the Curtis Pneumatic Machinery Co., 1931 Kienlen Avenue, St. Louis, Mo.

## A DEPENDABLE CONTRACTOR'S PLOW

The Wiard "Zini" super-plow for use with animal power, traction engine, road roller, dragline or other power and has only 9 parts, is described in a booklet which The Wiard Plow Co., Batavia, N. Y., will send on request.

## TRAILERS IN SIZES OF 1 1/2 TO 75 TONS

Highway machinery trailers that reduce each of the profitless periods spent on the road jobs, by hours, and that are made in a range of sizes from 1 1/2 to 75 tons and in several types, are described in detail in literature of the Highway Trailer Co., Edgerton, Wis.

## RAISE YOUR PROFITS WITH THIS HOIST

A bulletin describing the Flory 2-speed hoist that has an instantaneous change of speeds with load on the drum, without stopping the motor or hoist, and that is especially adapted to slack line excavation and quarry operations, will be sent to interested parties by the S. Flory Manufacturing Co., Bangor, Pa.

## A STEADY RELIABLE, PORTABLE COMPRESSOR

Bulletin 111 of the O. K. Clutch & Machinery, Columbia, Pa., describes the O-K portable compressor that gives you a steady, reliable supply of air all day long and comes in 3 sizes; 120, 160 and 265 cubic feet per minute.

## A 10-TON TRACTOR SHOVEL

Complete specifications and price will be sent by the Bay City Dredge Works, Bay City, Mich., on its 10-ton tractor shovel that can be quickly converted to shovel, clamshell, dragline or backfiller, and lifts 3000 pounds at an 18-foot radius and digs a ditch to 11 feet.

## TEN TIMES MORE LIGHT

"Ten times more light than an oil lantern, and at less cost," is a remark by a railroad man explaining why thousands of carbide lanterns of the National Carbide Sales Corporation, 342 Madison Avenue, New York, are being used by those who want a dependable, strong, clear and penetrating light. Literature will be supplied on request.

## GAS LOCOMOTIVES FOR EFFICIENT SERVICE

Brookville locomotives with McCormick-Deering, International and Fordson power units that are made in models from 1 1/2 to 12 tons with 3 forward speeds and 3 reverse, are described in literature of the Brookville Locomotive Co., Brookville, Pa.

## ASPHALT MIXING PLANTS

Iroquois asphalt mixing plants in guaranteed capacities of 400, 1000, 1500 and 2000 square yards, that are portable or stationary, electric or steam driven, are described in literature which the Iroquois Sales Department, The Barber Asphalt Co., Philadelphia, Pa., will send on request.

## DEPENDABLE DIAPHRAGM PUMPS

A descriptive bulletin of "Domestic" diaphragm pump units that are dependable, sturdy and efficient, will be sent on request, by the Domestic Engine & Pump Co., Shippensburg, Pa.

## A BUCKET, AND AGGREGATE PLANT

Two catalogs describing the Erie bucket that has a maximum digging capacity, and the Erie aggregate plant that is quickly moved, quickly assembled and speeds up road and concrete jobs, will be sent interested contractors and engineers by The Erie Steel Construction Co., Erie, Pa.

## GASOLINE AND DIESEL LOCOMOTIVES

Plymouth gasoline and diesel locomotives that keep the mixers busy in the wet season when there is danger of loss by truck haulage as well as in good weather, are described in literature of the Plymouth Locomotive Works of The Fate-Root-Heath Co., Plymouth, Ohio.

## A BETTER AND NEW POWER SHOVEL

A full-revolving shovel with full-length crawlers, patented telescoping beam on skimmer scoop and patented controls on the ditcher scoop is described in literature of The Star Drilling Machine Co., 505 Washington Street, Akron, Ohio.

## HOW TO CURE CONCRETE

This is the title of a manual of instruction on the curing of concrete pavements, that tells all about Dowflake calcium chloride as an admixture, and which will be sent to interested contractors and engineers by The Dow Chemical Co., Midland, Mich.

## ROAD BUILDING EQUIPMENT

Complete information on the Euclid line of heavy-duty wheel scrapers, rotary fennos and all-steel tractor-drawn dump wagons, that move earth quickly and economically and are built to withstand the most severe strains imposed by the heaviest tractors, will be sent by The Euclid Crane & Hoist Co., Euclid, Ohio.

## TRENCH EXCAVATING MACHINERY

Trench excavating machinery that handles more dirt per dollar and is dependable, durable and capable of handling the toughest job, is described in literature of The Parsons Co., Newton, Iowa.

## VIBRATIONLESS MOTORS

A 2-cylinder Novo Roller engine that is vibrationless even when running at 1800 r.p.m. is described and illustrated in literature which the Novo Engine Co., 216 Porter Street, Lansing, Mich., will be glad to send on request.

## A MIXER THAT CUTS AND SHOVELS

Mixers for plaster and mortar that cut and shovel and have a criss-cross blade action, facilitating plastering 15 to 20 per cent more yards daily, are described in literature of The Meili-Blumberg Co., Inc., New Holstein, Wis.

## HOISTS FOR MAXIMUM SERVICE

Literature describing Lidgerwood hoists of the Lidgerwood Manufacturing Co., Elizabeth, N. J., of which seventeen 9 x 10 hoists were used in building the Pee Dee Dam on the Pee Dee River, North Carolina, will be sent by the manufacturers.

## FOR MAXIMUM DIRT MOVING

A quick, accurate and satisfactory method of dumping dirt is by using the Keystone Pullscoop with electric trip that avoids all spillage and shoots it through the bottom. This is described in literature which the Keystone Driller Co., Beaver Falls, Pa., will send on request.

## ECONOMICAL TRANSPORTATION WITH WIRE ROPE

Economical transportation can be accomplished with wire rope with a reputation for long endurance, that is described in literature of the Williamsport Wire Rope Co., Williamsport, Pa.

## HOIST AND BODY UNITS THAT PAY REAL PROFITS

Hoist and body units that are profit producers because their action is positive and trouble-free and that, while having lighter-than-ordinary truck bodies have a strength far out of proportion to the weight, are described in literature of the Truck Division of The Van Dorn Iron Works Co., 2685 79th Street, Cleveland, Ohio.

## ASPHALT PRODUCTS FOR HIGHWAYS

Standard asphalt binders, cold patch asphalt, refined asphalt, paving flux, bridge asphalt and preserving oils of the Standard Oil Co. of New York, 28 Broadway, New York, are described in literature of the company, available on request.

## A REVOLVING TRACTOR SCRAPER

The "Groundhog," a revolving tractor scraper for use with the Caterpillar 2-ton, Cletrac "K," Fordson, Twin-City, etc., is described in literature of The Roderick Lean Co., Mansfield, Ohio.

## AN AUTO HEATER AND DISTRIBUTOR

A heater and distributor that is equipped with the Kinney positive pressure pump, and spraying nozzles, and circulating and heating systems and is self-loading from tank cars, is described in a booklet which the Kinney Manufacturing Co., Boston, Mass., will send on request.

## A HIGHLY-PORTABLE TRACTOR CRANE

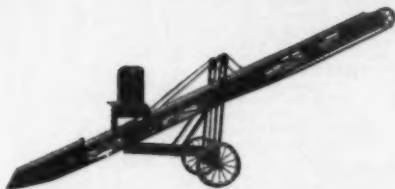
A highly-portable unit, the Tractocrane, available with McCormick-Deering or Fordson power unit on rubber-tired wheels, semi- or full-crawler traction, that is one-man operated and has great speed of operation, is described in literature of The Vergan-Schmidt Co., Dubuque, Iowa.

## PERMANENT HIGHWAY CONSTRUCTION

Warrenite-Bitulithic pavements for beauty, durability, and minimum maintenance costs, are described in literature of Warren Brothers Co., Boston, Mass.

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## PORTABLE Belt Conveyors



Manufactured in Lengths 20 to 60  
feet with Belts 20 inches or  
24 inches in Width  
Equipped with Electric Motor or  
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In Dam Construction, Open Quarries,  
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have proved to be the most economical  
method of material handling. For 38  
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building cableways. Let this experience  
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Operation  
takes less  
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minute, one  
cut puts the  
seizing or  
whips on  
both ends at  
same time.



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Any grade  
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cable up to  
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## Two Marks of a Good Power Scraper

The  
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is designed so that the tendency  
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long and has rudder-like front-  
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**A DOUBLE-ARCH DRAGLINE**

Bulletin DS-1 of the G. H. Williams Co., 609 Haybarger Lane, Erie, Pa., describes the Williams double-arch dragline—the bucket that has the strength and stamina to stand years of hard digging without drawing in at the sides.

**MAKING MONEY AT THE STOCK PILE**

Bulletin No. C. R. 6 of the Koehring Co., Milwaukee, Wis., describes and illustrates the Koehring crane that makes money at the stock pile, that is fast in hoisting, fast swinging and of heavy-duty construction.

**HEAVY-DUTY ENGINES THAT ARE DEPENDABLE**

Waukesha "Ricardo Head" heavy-duty engines that are standard equipment on many portable gravel plants where speed, dependability and low cost are features, are described in literature which the Industrial Equipment Division of the Waukesha Motor Co., Waukesha, Wis., will be glad to send on request.

**DERRICKS AND WINCHES**

A complete line of derricks and winches is described and illustrated in literature of the Sagen Derrick Co., 3101 Grand Avenue, Chicago, Ill.

**GUARANTEED CLAMHELL BUCKETS**

A fast closing, fast opening and fast discharging digging clamshell bucket that will give long satisfactory service is described in an illustrated catalog of the Jos. F. Kiesler Co., 936 W. Huron Street, Chicago, Ill.

**HEAVY-DUTY TRAILERS**

Literature of the Rogers Brothers Corp., Albion, Pa., describes heavy-duty trailers that will take loads up to 75 tons, that run on any highway, and that will be built to meet your demands.

**COST DATA ON CONSTRUCTION WORK**

A 140-page book entitled "100 and 1 Ways to Save Money with Portable Compressors" that contains a great variety of comparative cost data, as well as 300 interesting photographs, has been published by the Ingersoll-Rand Co., 11 Broadway, New York, and is available on request.

**A NEW PLATFORM BODY TRAILER**

A new platform body trailer, Model CR-21, that is constructed so as to carry two-thirds of the load on the rear creeper wheels and the other third on the front steel wheels, eliminating all torque of the frame, is described in literature of The Miami Trailer-Scraper Co., 610 S. Clay Street, Troy, Ohio.

**AN IMPROVED MOTOR PATROL**

The Russell motor patrol No. 4 for use with Caterpillar, McCormick-Deering, Cietrac tractors, that has an independent scriber and many new improvements, is described in literature which the Russell Grader Manufacturing Co., Minneapolis, Minn., will be glad to send on request.

**A COMPLETE COMPRESSOR LINE**

Buhl compressors that are made in a wide range of sizes and types and that, with one man, will do the work that 6 to 8 men can do with pick and shovel, are described completely and illustrated in a new catalog of The Buhl Co., 405 S. Dearborn Street, Chicago, Ill.

**BOMB SHELL TORCHES FOR DANGER SIGNALS**

McCloskey bomb shell torches for danger signals on construction jobs, that are made in two halves, of rolled and pickled deep drawn steel and welded together, with sufficient cast iron counter balance pressed in the bottom to prevent them from being knocked over, are described and illustrated in circulars of the McCloskey Torch Co., Spitzer Building, Toledo, Ohio.

**A COMPLETE LINE OF MOTOR GRADERS**

Copies of new catalogs and bulletins published by The Galion Iron Works & Manufacturing Co., Galion, Ohio, describing their new motor graders, may be obtained free on request. This includes a 16-page catalog on McCormick-Deering E-Z Lift motor graders, and bulletins describing the Galion Cietrac, Twin City and Caterpillar powered motor graders, Galion center-control Fordson and McCormick-Deering power graders.

**A COMPLETE LINE OF HOISTS**

Catalog No. 4A of The Mundy Sales Corporation, describing the complete line of electric hoists of this company, may be secured by interested contractors and engineers on request to Charles H. Foster, Sales Manager, 30 Church Street, New York.

**A POSITIVE OILING TRIPLEX ROAD PUMP**

Positive lubrication of every bearing by means of a rotary, force feed pump with only one moving part, is one of the many features of the 1928 model Triplex road pump of The Barnes Manufacturing Co., Mansfield, Ohio, which is described and illustrated in literature of that company.

**AN IMPROVED MATERIAL TOWER**

Bulletin 25-X of The Lakewood Engineering Co., Cleveland, Ohio, completely describes the Lakewood steel material tower that has few loose pieces, requires few bolts, no nuts, and has all intermediate section bolt threads protected from the weather. Copies of the Bulletin will be gladly sent on request.

**A SINGLE-CYLINDER, VERTICAL ENGINE**

A single-cylinder, vertical-type power unit that is compact, small over all, economical in operation, and that develops 2 to 3 horsepower is described in literature of the Stover Manufacturing & Engine Co., 15 Lake Street, Freeport, Ill., which will be sent to interested contractors and engineers on request.

**COMPRESSED CONCRETE PAVEMENT**

An illustrated booklet of the American Vibrolithic Corp., Insurance Exchange Building, Des Moines, Iowa, tells all about Armoplated compressed concrete pavement that is built under an improved scientific process of construction growing out of the Vibrolithic method of compressing the air and excess water out of the plastic concrete by the combined forces of vibration and pressure simultaneously applied, leaving a slab with low water-cement ratio, and producing a pavement of maximum strength and density.

**A HALF-CIRCLE 1/2-YARD CRANE-SHOVEL**

The new model of the Byers Bear Cat made by The Byers Machine Co., Ravenna, Ohio, which is a half-circle 1/2-yard, crane-shovel, equally useful for skimming, ditching and backfilling, is described in literature of the company.

**A NEW CABLE CUTTER**

A cable cutter that introduces a new method of cutting steel cable, converting a tedious operation into a simple task, that will cut any grade or size of cable up to 1 inch in diameter, leaving both of the cut ends encased in a steel band by one operation, is described in a circular which may be secured from Horace Hills, 533-539 Market St., San Francisco, Calif.

**MIXERS AND SAW RIGS**

Catalog No. 28 of The Knickerbocker Co., Jackson, Mich., describes and illustrates in an extensive catalog the Knickerbocker line of concrete, mortar, plaster and mastic mixers, and contractors' saw rigs.

**ROTARY SCRAPER WITH OR WITHOUT WHEELS**

Rotary scrapers that are easily handled by one man with tractor or horses and that may be used with or without wheels, are described in an illustrated circular of the Atlas Scraper Co., Box A-1, Los Angeles, Calif.

**A HEAVY-DUTY SCREEN**

A heavy-duty screen for rock-crushing contractors that has an all steel screen box with a very desirable cloth stretching feature, made possible by reason of the greater weight carrying capacity of the heavy-duty drive head with its double opposed balance wheel system, and meshes of 1 1/2-inches down to the finest, is described in Catalog No. 81 of The Orville Simpson Co., 1230 Knowlton Street, Cincinnati, Ohio.

**SINKING WET SHAFTS**

This is the title of a recent Explosives Service Bulletin, which is published by E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., and is available to interested contractors and engineers. The bulletin is instructive, well illustrated with diagrams, and has been written by A. E. Anderson, E. M., technical representative of the company.

**ROAD MAINTENANCE**

Tarvia for road maintenance work is discussed in all its different treatments in a 51-page booklet of The Barrett Co., 40 Rector Street, New York. Copious illustrations showing the use of this surfacing on every type of road and pavement, except earth roads, are used throughout the book.

**TWO NEW DIE STOCKS**

Complete information regarding the two new self-contained and adjustable 1 to 2-inch die stocks, known as the No. 11 Beaver plain tool and the No. 11-A Beaver ratchet, may be secured from the Borden Co., Warren, Ohio.

**A HIGH-LIFT LOADER AND LOW-LIFT SHOVEL**

A high-lift loader and low-lift shovel that has a shovel with a 3 1/2-foot lift with an almost unlimited field of activity and a loader with a 7-foot lift that will load a truck or wagon in a few minutes' time, is described in literature which the Trackson Co., 519 Clinton Street, Milwaukee, Wis., will be glad to send on request.

**GASOLINE LOCOMOTIVES**

Up-to-date information on narrow gauge gasoline locomotives ranging from 10 to 30 tons, as well as copious illustrations and diagrams, is given in a new bulletin of the Geo. D. Whitcomb Co., Rochelle, Ill., that is available on request.

**A LIGHT, COMPACT, POWERFUL COMPRESSOR**

The "Thor 6," that is a light, compact and powerful compressor with the Rix-Super-Charger feature that enables the unit to deliver more air than usual, is described in literature which the Independent Pneumatic Tool Co., 600 W. Jackson Blvd., Chicago, Ill., will send to contractors and engineers.

**FASTER, HANDIER TRAILER MIXERS**

The new No. 3 1/4 trailer mixer, featuring the new friction tilting device that gives more speed, greater ease and better work, is described in a complete catalog of late model, low priced mixers, which the Kwik-Mix Concrete Mixer Co., Dept. 60, Port Washington, Wis., will be glad to send on request.

**A 4-WHEEL DRIVE TRUCK**

A 4-wheel drive, 5-ton truck, Model X-100, of the Coleman Motors Corp., 314-316 Eye Street, N. E., Washington, D. C., that is designed primarily to operate economically under adverse conditions of deep snow, mud, sand, steep hills, and slippery roads, is described in literature of the manufacturers.

**OIL ENGINES**

The Walter A. Zelnicker Supply Co., 511 Locust St., St. Louis, Mo., will be pleased to send a copy of its Oil Engine Bulletin No. 362 to any contractors interested in this type of prime mover for construction equipment.

**A NEW FORD HYDRAULIC HOIST**

The new Model G-1 power operated hydraulic hoist which has been recently developed by the Wood Hydraulic Hoist & Body Co., Detroit, Mich., for use with the Model AA Ford chassis, is described in literature which may be secured on request from that company.

**A BUCKET FOR EVERY JOB**

The Hayward line of clamshell, orange peel, dragline and electric motor buckets, as well as dredging, excavating and coal handling machinery, automatic take-up reels, counter-weight drums, etc., are described in literature of The Hayward Co., 32-36 Day Street, New York, which is available to contractors and engineers.

**ALUMINUM RULES**

Aluminum rules in 10th and 100th of feet, for civil engineers, surveyors, highway builders, and others, that are accurate, light weight, durable, rust proof, and furnished with or without folding end hook, are described in literature of The Lufkin Rule Co., Saginaw, Mich.

**CYLINDRICAL STOPPERS FOR PIPES**

Goodman cylindrical stoppers, for use in gas, oil, water and drain pipes to facilitate repairs to the pipes, are manufactured by the Safety Gas Main Stopper Co., 523 Atlantic Avenue, Brooklyn, N. Y., and described in literature which is available to contractors and engineers on request.

**DRAINS, CHECK VALVES, SEWER VALVES, ETC.**

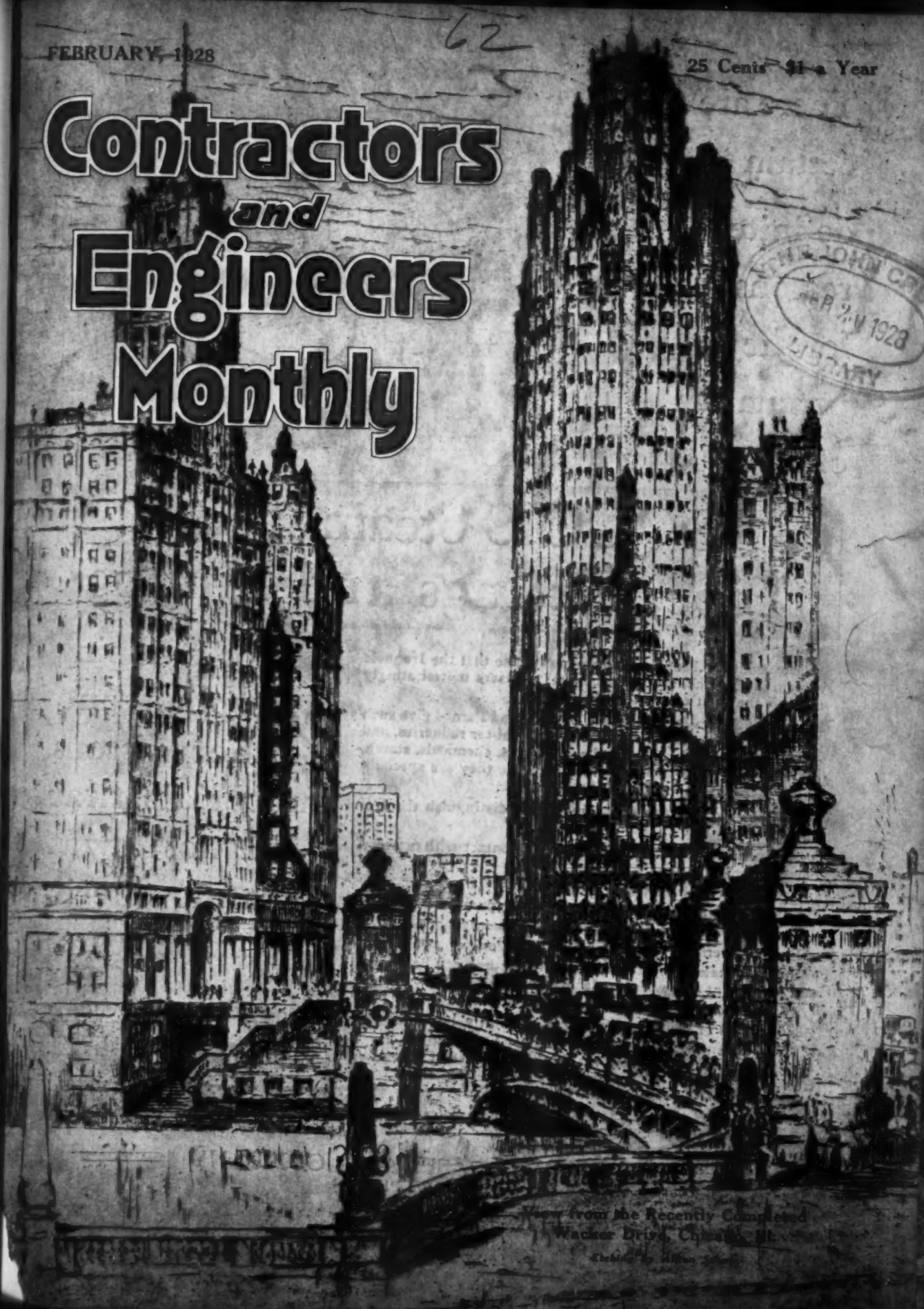
The new Josam catalog "G," which contains 72 pages with more than 100 illustrations, recommended uses, and descriptions of the Josam line of drains, grease, plaster and hair interceptors, open seat swing check valves, open seat back water sewer valves, combination closet fittings and bends with cast closed end, is available on request to the Josam Manufacturing Co., 2nd and Canal Road, Michigan City, Ind.



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FEBRUARY, 1928

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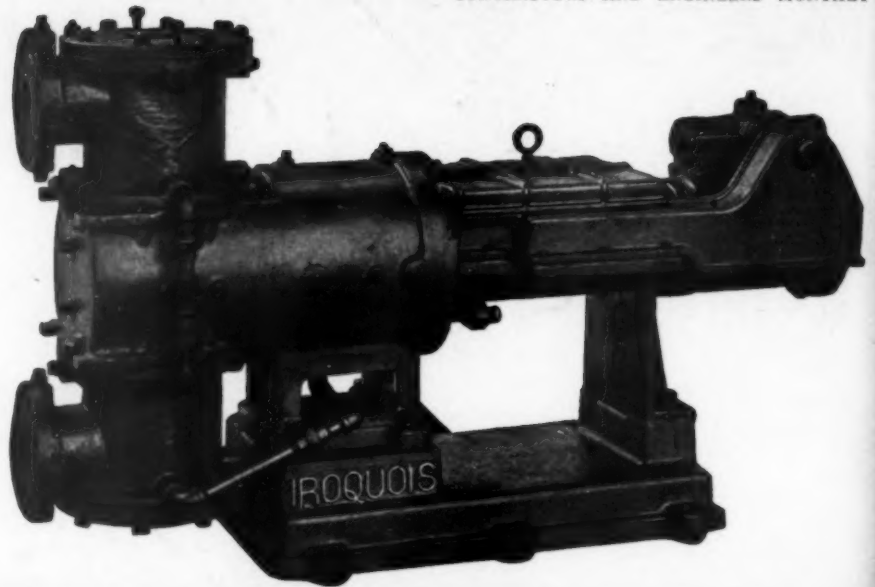
# Contractors *and* Engineers Monthly



View from the Recently Completed  
Wacker Drive, Chicago, Ill.

Sketch by Wilson

There are  
certain  
definite  
reasons  
for the  
popularity  
of the



## IROQUOIS Steam-Jacketed Pipe, Fittings and Pumps

Because it has been found from experience that the Iroquois system is so quick, safe and economical, users unhesitatingly say it is the most efficient ever devised.

Iroquois Steam-Jacketed Pipe, Fittings and Pumps give such complete satisfaction in asphalt, oil and coal-tar refineries, and plants manufacturing prepared roofing, gas, chemicals, starch, glucose, molasses, fatty acids, etc., because they are specially designed for those particular purposes.

Some of the distinctive features which distinguish the Iroquois Steam-Jacketed Pump are:

Minimum number of working parts in contact with material being pumped.

Large wearing surfaces to reduce wear.

Large, straight passages for liquid being pumped.

Simplicity of construction insures low maintenance cost.

Ease of operation with no skilled attention.

Steam jackets cover all moving parts—pump can be started and stopped at will without cleaning out.

Perfect accessibility of all wearing parts.

No springs or small, easily broken parts in valve chambers.

Handles successfully viscous material containing large quantities of foreign matter without undue wear or operating troubles.

for pumping  
asphalt and  
other viscous  
materials that  
will not flow at  
atmospheric  
temperatures

*Write us today for full data and specifications. We will also send you information regarding the complete Iroquois Line of road-building machinery.*

*Iroquois Sales Department*

**THE BARBER ASPHALT COMPANY**  
PHILADELPHIA

New York

Chicago

Pittsburgh

St. Louis

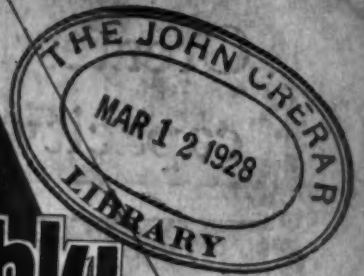
Kansas City

San Francisco

MARCH, 1928

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# Contractors *and* Engineers Monthly



BUILDING THE NEW  
COLUMBUS, OHIO, CITY HALL  
SEE PAGE 173

10 TONS

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of



Greatest capacity      Fastest mixing      Minimum cost operation

With these advantages it is easy to understand why Iroquois Asphalt Mixing Plants are so universally used by contractors and municipalities. They have not only demonstrated that they are equal to every requirement, but their output actually exceeds by far their guaranteed capacity.

The high perfection of the Iroquois is the result of more than forty years' experience in the construction of asphalt pavements, and upwards of a quarter-century's experience in the designing of equipment for that express purpose.

Among the latest improvements is a steam-

jacketed pump for delivering asphalt from the melting kettles to the weigh bucket, with a rated capacity of 50 gallons of asphalt per minute. The asphalt end of the pump is completely steam-jacketed and has only three moving parts.

Iroquois Asphalt Mixing Plants are made with guaranteed capacities of 400, 1000, 1500 and 2000 square yards. Portable or stationary; electric or steam driven. Write to us and we will gladly send you full details, together with complete information about the entire Iroquois Line—driers, rollers, paving tools, and all equipment for street-paving and road-building work.

*Iroquois Sales Department*

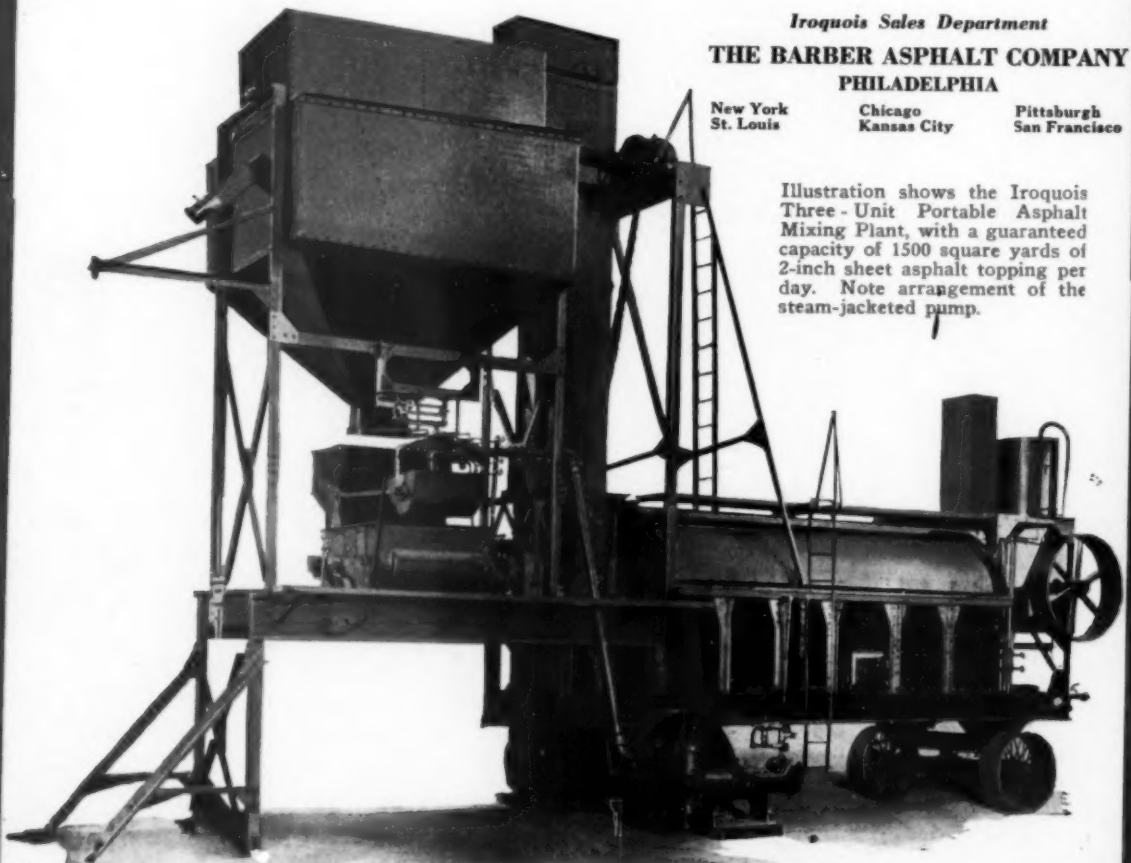
**THE BARBER ASPHALT COMPANY  
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New York  
St. Louis

Chicago  
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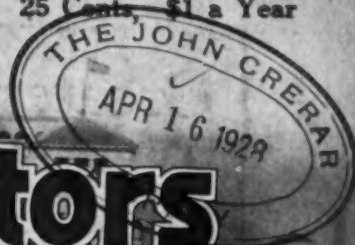
Pittsburgh  
San Francisco

Illustration shows the Iroquois Three - Unit Portable Asphalt Mixing Plant, with a guaranteed capacity of 1500 square yards of 2-inch sheet asphalt topping per day. Note arrangement of the steam-jacketed pump.



APRIL, 1928

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# Contractors *and* Engineers Monthly



PHOTO BY  
WING GALLOWAY, N.Y.

**Greatest  
capacity**

**Fastest  
mixing**

**Minimum cost  
of operation**

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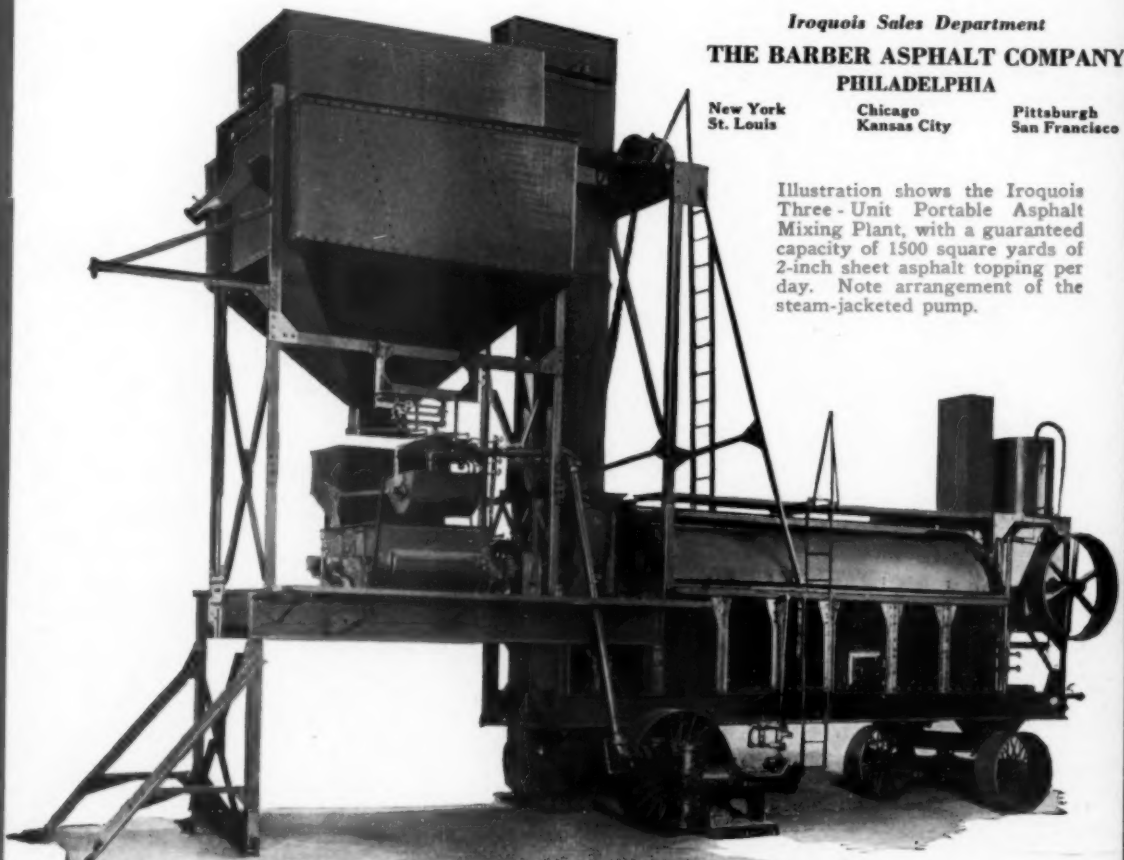
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Illustration shows the Iroquois Three - Unit Portable Asphalt Mixing Plant, with a guaranteed capacity of 1500 square yards of 2-inch sheet asphalt topping per day. Note arrangement of the steam-jacketed pump.





MAY, 1928

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# Contractors and Engineers Monthly



A Completed Section of the  
Transmountain Highway

See pages 227-230 for description of  
construction work on bridge section.

# The qualities that make the Iroquois so desirable

The height of perfection reached in the new Iroquois Tandem Roller is the natural development of more than forty years' experience in the designing and operation of street and road-building machinery.

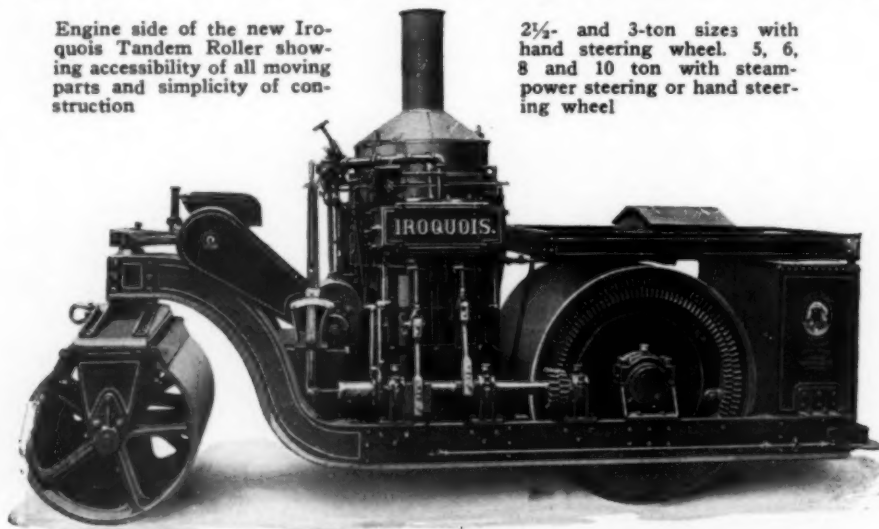
And that its distinctive qualities are recognized is evidenced by the fact that the Iroquois is used by leading contractors and large municipalities.

Actual service tests have proved that the new Iroquois Tandem Roller adequately meets every requirement in rolling asphalt, brick, macadam, wood blocks, new grades and golf links.

We will gladly send you complete specifications upon request—together with full information regarding the entire Iroquois Line of mixing plants, driers, paving tools, and other street-paving and road-building equipment. Write us today.

Engine side of the new Iroquois Tandem Roller showing accessibility of all moving parts and simplicity of construction

2½- and 3-ton sizes with hand steering wheel. 5, 6, 8 and 10 ton with steam-power steering or hand steering wheel



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**THE BARBER ASPHALT COMPANY**  
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**Low maintenance cost**  
**Great power—Quick reverse**  
**Simple construction—Long life**

JUNE, 1928

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# Contractors' and Engineers' Monthly

JOHN CRE  
JUN 15 1928  
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The New Fidelity-Philadelphia Trust  
Company Building, Philadelphia, Pa.

See page 389

Architect by Anton Schuch



# The qualities that make the Iroquois so desirable

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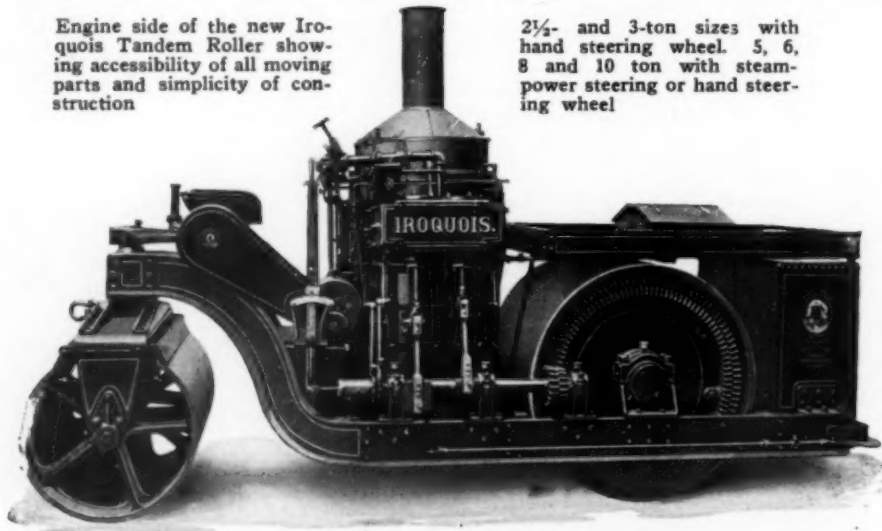
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# Contractors' and Engineers' Monthly

JOHN CRE  
JUN 15 1928  
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The New Fidelity-Philadelphia Trust  
Company Building, Philadelphia, Pa.

See page 300

Lighting by Anton Schott



View showing construction of concrete lining in main canal of Kittitas Reclamation Project. Note how closely Hunt Process workers follow pouring machine.

# Hunt Process of Curing Concrete *without Dirt or Water.*

## In use on United States Reclamation Service Project, Kittitas, Washington.

### McEVERLAST Protective Coatings for All Buried and Exposed Metal Surfaces and Pipe Lines

These coatings, applied cold, successfully protect pipe lines against corrosion and electrolysis—have stood continuous three months' test subject to 6 volts, 30 amperes, in a 5 per cent salt solution and heavy alkaline soils without breaking down.

For exposed metal surfaces our "99" and Luminite have withstood constant exposure to salt air for several years without any deterioration. Write for booklet on these products.

This vast reclamation service project involves the construction of more than 26 miles of main canal, about 14 miles of which is concreted. The Hunt Process, with the approval of the U. S. Reclamation Service Engineers, has replaced former methods of curing this concrete work.

The Hunt Process saves much time and labor—avoids the necessity for temporary dams to keep water used in curing away from new work—allows the fresh concrete to be walked on sooner—assures a uniform "cure" of sides and bottom, free from hair checks—leaves a waterproof surface.

Write for our new book, "Curing Concrete Without Dirt or Water by the Hunt Process."



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# Where to Purchase

A comprehensive classification of the leading machinery and supply manufacturers arranged for the convenience of contractors, engineers and public officials who may wish to secure information about construction equipment.  
The index of Advertisers faces the inside back cover. When writing to advertisers please mention the CONTRACTORS & ENGINEERS MONTHLY. A star (\*) before the manufacturer's name indicates that his advertisement appears in this issue.

This index is published as an aid to the reader, but the publishers assume no responsibility for errors or omissions.

## AERIAL WIRE ROPE TRAMWAYS

- \*American Steel & Wire Co., Chicago
- Broderick & Bascom Rope Co., St. Louis
- Hasard Insulated Wire Wks., Wilkesbarre, Pa.
- A. Leschen & Sons Rope Co., St. Louis

## AIR COMPRESSORS

- \*American Steam Pump Co., Battle Creek, Mich.
- \*Barnes Mfg. Co., Mansfield, O.
- \*Buhl Company, Chicago
- \*Cement-Gun Co., Allentown, Pa.
- \*Curtis Pneumatic Machy. Co., St. Louis, Mo.
- \*Domestic Eng. & Pump Co., Shippensburg, Pa.
- \*Independent Pn. Tool Co., Chicago, Ill.
- \*Nove Engine Co., Lansing, Mich.
- \*O. K. Clutch & Mach. Co., Columbia, Pa.
- \*Stover Mfg. & Eng. Co., Freeport, Ill.
- \*Sullivan Machinery Co., Chicago
- Allis-Chalmers Mfg. Co., Milwaukee
- Chicago Pneumatic Tool Co., N. Y.
- Cook Motor Co., Delaware, O.
- De Laval Steam Turbine Co., Trenton, N. J.
- Fairbanks, Morse & Co., Chicago
- Gardner-Denver Co., Quincy, Ill.
- General Electric Co., Schenectady, N. Y.
- Hardie-Tynes Mfg. Co., Birmingham, Ala.
- Indiana Air Pump Co., Indianapolis, Ind.
- Ingersoll-Rand Co., N. Y.
- Nordberg Mfg. Co., Milwaukee
- Norwalk Iron Works Co., So. Norwalk, Conn.
- Schramm, Inc., West Chester, Pa.
- United Iron Works, Kansas City, Mo.
- Westinghouse Traction Brake Co., Wilmerding, Pa.
- Worthington Pump & Machinery Corp., N. Y.

## AIR COMPRESSORS, PORTABLE

- \*Buhl Co., Chicago
- \*Cement-Gun Co., Allentown, Pa.
- \*Curtis Pneumatic Machy. Co., St. Louis, Mo.
- \*Domestic Eng. & Pump Co., Shippensburg, Pa.
- \*O.K. Clutch & Machy. Co., Columbia, Pa.
- \*Sullivan Machinery Co., Chicago
- Chain Belt Co., Milwaukee, Wis.
- Chicago Pneumatic Tool Co., New York
- Ingersoll-Rand Co., New York
- Metalweld, Inc., Philadelphia, Pa.
- National Brake & Electric Co., Milwaukee
- Schramm, Inc., West Chester, Pa.

## ARC LAMPS

- General Electric Co., Schenectady, N. Y.
- Westinghouse Electric & Mfg. Co., E. Pittsburgh, Pa.

## ARTESIAN WELL DRILLS & PUMPS

- \*Star Drilling Machine Co., Akron, O.
- American Well Works, Aurora, Ill.
- Ingersoll-Rand Co., New York

## ASBESTOS PRODUCTS

- \*Phillip Carey Co., Cincinnati
- Keasbey & Mattison Co., Ambler, Pa.
- Mikesell Bros. Co., Waukegan, Ind.
- Norristown Mag. & Asb. Co., Norristown, Pa.
- Sall Mountain Co., Chicago

## ASH HANDLING MACHINERY

- \*Bucyrus-Erie Co., Erie, Pa.
- \*Chicago Automatic Conv. Co., Chicago
- \*Fairfield Engineering Co., Marion, Ohio
- \*Lakewood Eng. Co., Cleveland, O.
- \*Mack Trucks, Inc., N. Y.
- \*Link-Belt Co., Chicago
- Allis-Corp., New York
- C. O. Barrett & Snow Co., Cleveland, O.
- Byers Mach. Co., Ravenna, O.
- Chain Belt Co., Milwaukee
- Gifford-Wood Co., Hudson, N. Y.
- Green Eng. Co., E. Chicago, Ind.
- Geo. Haisa Mfg. Co., N. Y.
- Industrial Brownhoist Corp., Cleveland, O.
- Jeffrey Mfg. Co., Columbus, O.
- Mead-Morrison Mfg. Co., E. Boston, Mass.
- Orton Crane & Shovel Co., Chicago
- Portable Mach. Co., Clifton, N. J.
- Robins Conv. Belt Co., N. Y.
- Jas. B. Seaverns Co., Batavia, Ill.
- Webster Mfg. Co., Chicago
- Weller Mfg. Co., Chicago

## ASPHALT

- \*Barrett Co., N. Y.
- \*Standard Oil Co. (Ind.), Chicago
- \*Standard Oil Co. (N. Y.), N. Y.
- \*Warren Bros. Co., Boston
- Atlantic Ref. & Asph. Corp., Phila.
- Barber Asphalt Co., Philadelphia
- Gulf Refining Co., Pittsburgh
- Ky. Rock Asph. Co., Louisville, Ky.
- Natural Rk. Asph. Corp., Greensboro, Ky.
- New Orleans Ref. Co., New Orleans
- Pioneer Asph. Co., Lawrenceville, Ill.
- Sinclair Ref. Co., Chicago
- Standard Oil Co. of Cal., S. Francisco
- Standard Oil Co. of La., N. Orleans
- Standard Oil Co. of N. J., Newark
- Texas Co., N. Y.

## ASPHALT BLOCK

- Hastings Pavement Co., N. Y.

## ASPHALT BRICK

- Asphalt Brick Co., St. Louis

## ASPHALT CUTTERS

- \*Independent Pneumatic Tool Co., Chicago
- \*Sullivan Machinery Co., Chicago
- Chicago Pneumatic Tool Co., N. Y.
- Cleveland Rock Drill Co., Cleveland, O.
- Dayton Pneum. Tool Co., Dayton, O.
- Gardner-Denver Co., Quincy, Ill.
- Ingersoll-Rand Co., N. Y.
- Littleford Bros., Cincinnati

## ASPHALT KETTLES (See Kettles for Asphalt and Tar Heating)

## ASPHALT PLANTS, TOOLS, ETC.

- \*Aeroll Burner Co., West New York, N. J.
- \*Warren Bros. Co., Boston
- American Fin-Mix Co., Chicago, Ill.
- Barber Asphalt Co., Philadelphia
- Chausse Oil Burner Co., Elkhart, Ind.
- F. D. Cummer & Son Co., Cleveland, O.
- J. D. Farasey Mfg. Co., Cleveland, O.
- Hetherington & Berner, Indianapolis
- Hauck Mfg. Co., Brooklyn, N. Y.
- Littleford Bros., Cincinnati
- Merriman Asphalt Plant, Inc., Lima, O.
- Mosher Mfg. Co., Chicago, Ill.

## ASPHALT ROLLERS (See Road Rollers)

## ASPHALT SURFACE HEATERS

- \*Aeroll Burner Co., West New York, N. J.
- Barber Asphalt Co., Philadelphia
- Chausse Oil Burner Co., Elkhart, Ind.
- Equitable Asp. Maint. Co., Kan. City, Mo.
- Good Roads Equip. Corp., Philadelphia
- Hauck Mfg. Co., Bklyn, N. Y.

## BACKFILLERS

- \*Baker Mfg. Co., Springfield, Ill.
- \*Bay City Dredge Wks., Bay City, Mich.
- \*Bucyrus-Erie Co., Erie, Pa.
- \*Byers Machine Co., Ravenna, O.
- \*Construction Machy. Co., Waterloo, Ia.
- \*Ersted Mfg. Co., Portland, Ore.
- \*Koehring Co., Milwaukee, Wis.
- \*Link-Belt Co., Chicago
- \*Miami Trailer-Scrapper Co., Troy, O.
- \*Parsons Co., Newton, Ia.
- \*Star Drilling Mach. Co., Akron, O.
- Austin Mach. Corp., Muskegon, Mich.
- Buckeye Trac. Ditcher Co., Findlay, O.
- Harnischfeger Corp., Milwaukee, Wis.
- LaPlant-Chaste Mfg. Co., Cedar Rapids, Iowa
- Orton Crane & Shovel Co., Chicago
- Speeder Mch. Corp., Cedar Rapids, Ia.
- Waterman Corp., Detroit
- Weller Mfg. Co., Chicago

## BAGS

- \*Bates Valve Bag Corp., Chicago

## BAG TRUCKS

- \*Bates Valve Bag Corp., Chicago

## BAR BENDERS AND CUTTERS

- \*Koehring Co., Milwaukee, Wis.
- \*Ransome Conc. Mch. Co., Dunellen, N. J.
- Buffalo Forge Co., Buffalo, N. Y.
- Concrete Steel Co., N. Y.
- Electric Welding Co., Pittsburgh
- D. A. Hinman & Co., Sandwich, Ill.
- J. L. Gleason & Co., Boston, Mass.
- McKenna Co., Cleveland, O.

## BAR CHAIRS, REINFORCING

- \*Truscon Steel Co., Youngstown, O.
- Concrete Steel Co., N. Y.
- Universal Form Clamp Co., Chicago

## BAR TIES

- \*Bates Valve Bag Corp., Chicago

## BATCH BOXES

- \*Blaw-Knox Co., Pittsburgh, Pa.
- \*Erie Steel Const. Co., Erie, Pa.
- \*Fairfield Engineering Co., Marion, Ohio
- \*Heltzel Stl. Form & Ir. Co., Warren, O.
- \*Jos. Honhorst Co., Cincinnati
- \*Lakewood Eng. Co., Cleveland, O.
- Easton Car & Const. Co., Easton, Pa.
- Easton Car & Const'n. Co. of Mo., Kansas City, Mo.
- Koppel Ind. Car & Equip. Co., Koppel, Pa.
- Littleford Bros., Cincinnati
- Jas. B. Seaverns Co., Batavia, Ill.
- Western Wheeled Scraper Co., Aurora, Ill.

## BATCHERS, (For Measuring Aggregates)

- \*Blaw-Knox Co., Pittsburgh, Pa.
- \*Fairfield Engineering Co., Marion, Ohio

## BEARINGS

- Fafnir Bearing Co., New Britain, Conn.
- Hyatt Roller Bear. Co., Harrison, N. J.
- New Departure Mfg. Co., Bristol, Conn.
- S. K. F. Industries, New York
- Timken Roller Bearing Co., Canton, O.

## BINS, STORAGE

- \*Austin-Western Rd. Mach. Co., Chicago
- \*Blaw-Knox Co., Pittsburgh, Pa.
- \*The Burch Corp., Cresskill, Ohio
- \*Erie Steel Const. Co., Erie, Pa.
- \*Fairfield Engineering Co., Marion, Ohio
- \*Good Roads Mch. Co., Kennett Sq., Pa.
- \*Heltzel Stl. Form & Ir. Co., Warren, O.
- \*O. S. Johnson Co., Champaign, Ill.
- \*Link-Belt Co., Chicago
- \*Russell Grader Mfg. Co., Minneapolis
- \*Ransome Conc. Mch. Co., Dunellen, N. J.
- Austin Mfg. Co., Chicago
- Birmingham Tank Co., Birmingham, Ala.
- Butler Bin Co., Waukegan, Wis.
- Canton Art Metal Co., Canton, O.
- Easton Car & Const'n. Co., Easton, Pa.
- Fairfield Eng. Co., Marion, O.
- Gallon Iron Wks. & Mfg. Co., Gallon, O.
- Industrial Brownhoist Corp., Cleveland, O.
- Lancaster Iron Wks., Inc., Lancaster, Pa.
- Pittsburgh-Des Moines Steel Co., Pittsburgh, Pa.
- Jas. B. Seaverns Co., Batavia, Ill.
- Universal Rd. Mach. Co., Kingston, N. Y.
- Weller Mfg. Co., Chicago

## BLADES FOR GRADERS & SNOW PLOWS

- \*Russell Grader Mfg. Co., Minneapolis
- J. D. Adams & Co., Indianapolis
- Gallon Iron Wks. & Mfg. Co., Gallon, O.
- Shunk Mfg. Co., Bucyrus, O.

## BLAST HOLE DRILLING MACHINES (See Well Drilling and Blast Hole Machines)

## BLASTING ACCESSORIES

- E. I. du Pont de Nemours & Co., Wilmington
- Hercules Powder Co., Wilmington

## BLASTING POWDER (See Explosives)

## BLOCKS AND TACKLE

- \*Boston & Lockport Blk. Co., Boston, Mass.

# Where to Purchase

- \*Dobbie Fdry. & Mach. Co., Niagara Falls, N. Y.**  
Western Block Co., Lockport, N. Y.
- BLOW TORCHES**  
Everhot Mfg. Co., Maywood, Ill.
- BLUE PRINT MACHINES**  
Paragon Mach. Co., Rochester, N. Y.  
O. F. Pease Co., Chicago  
Wickes Bros., Saginaw, Mich.
- BODIES: SPECIAL FORD**  
\*The Heli Company, Milwaukee, Wis.  
Anthony Co., Streator, Ill.  
Standard Comm. Body Corp., B'klyn., N. Y.
- BOILERS**  
\*Johnston Bros., Inc., Ferrysburg, Mich.  
Chandler & Taylor Co., Indianapolis.  
Chatta. Boiler & Tank Co., Chatta., Tenn.  
R. D. Cole Mfg. Co., Newnan, Ga.  
Combustion Eng. Corp., N. Y.  
Erie City Iron Wks., Erie, Pa.  
Hartley Bkr. Wks., Montgomery, Ala.  
Heine Boiler Co., St. Louis, Mo.  
E. Keeler Co., Williamsport, Pa.  
Ladd Water Tube Bkr. Co., Pittsbrgh, Pa.  
V. Lefell & Co., Springfield, O.  
Lord & Burnham Co., Irvington, N. Y.  
Murray Iron Wks. Co., Burlington, Ia.  
Wagle Eng. & Bkr. Wks., Erie, Pa.  
New Bern Iron Wks. & Sup. Co., New Bern, N. C.  
Petroleum Iron Wks. Co., Sharon, Pa.  
J. R. Schofield's Sons Co., Macon, Ga.  
Stanwood Corp., Cincinnati, O.  
Superior Body Corp., Marion, Ind.  
Vest. Mchv. Co., Inc., Louisville, Ky.  
Walsh & Weldner Bkr. Co., Chattanooga, Tenn.
- BRACES, TRENCHE**  
\*Templeton, Kenly & Co., Chicago  
Jas. H. Channon Mfg. Co., Chicago  
Duff Mfg. Co., Pittsburgh, Pa.  
Fisher & Hayes Rope & Steel Co., Chicago  
Hawley Mfg. Co., Chicago.  
Kalamazoo Fdry. & Mach. Co., Kalamazoo, Mich.  
Waldo Bros. & Bond Co., Boston
- BRANDING TOOLS**  
Everhot Mfg. Co., Maywood, Ill.
- BRASS GOODS**  
\*Union Water Meter Co., Worcester, Mass.  
Glanber Brass Mfg. Co., Cleveland, O.  
Haydenville Co., Haydenville, Mass.  
Hays Mfg. Co., Erie, Pa.  
Mueller Company, Decatur, Ill.  
United-Obendorf Corp., Cleveland, O.
- BREAKERS, CONCRETE**  
\*The Buhl Company, Chicago  
\*Independent Pn. Tool Co., Chicago  
\*Sullivan Machy. Co., Chicago  
Buckeye Trac. Ditcher Co., Findlay, O.  
Chicago Pneumatic Tool Co., N. Y.  
Cleveland Rock Drill Co., Cleveland, O.  
Gardner-Denver Co., Quincy, Ill.  
Hardsacer Wonder Drill Co., Ottumwa, Ia.  
Ingersoll-Rand Co., N. Y.  
Milwaukee Gas Tool Co., Milwaukee
- BRICK, PAVING (See Paving Brick)**
- BRICK CLEANING MACHINES**  
Elgin Gas Motor Co., Elgin, Ill.  
Rotor Air Tool Co., Cleveland
- BRIDGES, CONCRETE**  
\*Frederick Snare Corp., New York
- BRIDGES AND BUILDINGS, STEEL**  
\*Blaw-Knox Co., Pittsburgh, Pa.  
\*Frederick Snare Corporation, N. Y.  
American Bridge Co., N. Y.  
Bellefontaine Br. & Stl. Co., Bellefontaine, O.  
Belmont Iron Wks., Phila.  
Berlin Constr. Co., Berlin, Conn.  
Bethlehem Steel Co., Bethlehem, Pa.  
Boston Bridge Wks., Boston.  
Central States Br. Co., Indianapolis, Ind.  
Champion Bridge Co., Wilmington, O.  
Chesapeake Ir. Wks., Baltimore, Md.  
Clinton Bridge Wks., Clinton, Ia.  
Eastern Bridge & Struc. Co., Worcester, Mass.  
Flour City Orn. Iron Co., Minneapolis.  
Fort Pitt Br. Wks., Pittsburgh, Pa.  
Hughes-Keenan Co., Mansfield, O.  
Ingalls Ir. Wks. Co., Birmingham, Ala.  
Inter. Stl. & Ir. Co., Evansville, Ind.  
Lakeside Br. & Stl. Co., No. Milwaukee  
Louisville Br. & Ir. Co., Louisville, Ky.  
McClintic Marshall Co., Pittsburgh, Pa.  
Milwaukee Br. Co., Milwaukee, Wis.  
Minn. Stl. & Mchv. Co., Minneapolis.  
Missouri Vy. Br. & Ir. Co., Leavenworth, Kan.  
Mt. Vernon Br. Co., Mt. Vernon, O.  
Penn Bridge Co., Beaver Falls, Pa.  
Pittsburgh-Des Moines Stl. Co., Pittsburgh, Pa.  
Richmond Struc. Stl. Co., Richmond, Va.  
Riverside Br. Co., Martins Ferry, O.
- Virginia Br. & Ir. Co., Roanoke, Va.  
Wisc. Br. & Ir. Co., No. Milwaukee, Wis.
- BRONZE TABLETS**  
Flour City Orn. Ir. Co., Minneapolis.  
Imperial Brass Mfg. Co., Chicago  
J. L. Mott Iron Wks., N. Y.
- BROOMS (See Street Sweeping Brooms)**
- BUCKETS, AUTOMATIC DUMPING**  
\*Lakewood Eng. Co., Cleveland, O.  
\*Union Iron Wks., Inc., Hoboken, N. J.  
G. L. Steubner Ir. Wks., Inc., Long Island City, N. Y.
- BUCKETS, CLAM SHELL**  
\*Blaw-Knox Co., Pittsburgh, Pa.  
\*Erie Steel Const. Co., Erie, Pa.  
\*Hayward Co., N. Y.  
\*J. F. Kiesler Co., Chicago  
\*Lakewood Eng. Co., Cleveland, O.  
\*Link-Belt Co., Chicago  
Buffalo Hst. & Der. Co., Buffalo, N. Y.  
Browning Crane Co., Cleveland, O.  
F. A. Coleman Co., Cleveland, O.  
Geo. Hais Mfg. Co., N. Y.  
Industrial Brownhoist Corp., Cleveland  
McMyier Interstate Co., Cleveland, O.  
Mead-Morrison Mfg. Co., E. Boston, Mass.  
Orton Crane & Shovel Co., Chicago  
Owen Bucket Co., Cleveland, O.  
Page Eng. Co., Chicago  
G. H. Williams Co., Erie, Pa.
- BUCKETS, CONCRETE**  
\*Insley Mfg. Co., Indianapolis, Ind.  
\*Lakewood Eng. Co., Cleveland, O.  
\*Ransome Conc. Mchv. Co., Dunellen, N. J.  
\*Union Iron Works, Inc., Hoboken, N. J.  
Norris K. Davis, San Francisco, Calif.  
Koppel Ind. Car & Equip. Co., Koppel, Pa.  
G. L. Steubner Ir. Wks., Inc., Long Island City, N. Y.
- BUCKETS, DRAGLINE**  
\*Blaw-Knox Co., Pittsburgh, Pa.  
\*Dobbie Fdry. & Mchv. Co., Niagara Falls, N. Y.  
\*Hayward Co., New York  
\*Link-Belt Co., Chicago  
\*Russell Grader Mfg. Co., Minneapolis  
\*Sauerman Bros., Chicago  
Beach Mfg. Co., Charlotte, Mich.  
R. H. Beaumont Co., Philadelphia  
Gallon Ir. Wks. & Mfg. Co., Gallon, O.  
Monaghan Mach. Co., Chicago  
Page Eng. Co., Chicago  
Pioneer Bucket Co., Indianapolis, Ind.  
G. H. Williams Co., Erie, Pa.
- BUCKETS, DREDGING AND EXCAVATING**  
\*Blaw-Knox Co., Pittsburgh, Pa.  
\*Hayward Co., N. Y.  
\*J. F. Kiesler Co., Chicago  
\*Lakewood Eng. Co., Cleveland, O.  
\*Link-Belt Co., Chicago  
Browning Crane Co., Cleveland, O.  
Geo. Hais Mfg. Co., N. Y.  
Industrial Brownhoist Corp., Cleveland  
Mead-Morrison Mfg. Co., E. Boston, Mass.  
Orton Crane & Shovel Co., Chicago  
Owen Bucket Co., Cleveland, O.  
G. H. Williams Co., Erie, Pa.
- BUCKETS, ORANGE PEEL**  
\*Hayward Co., N. Y.  
\*J. F. Kiesler Co., Chicago  
\*Link-Belt Co., Chicago  
Industrial Wks., Bay City, Mich.  
McMyier Interstate Co., Cleveland, O.  
Mead-Morrison Mfg. Co., E. Boston, Mass.  
Orton Crane & Shovel Co., Chicago
- BUILDING FORMS (See Forms, Conc.)**
- BUILDING, STEEL (See Bridges)**
- BULLDOZERS**  
LaPlant-Choate Mfg. Co., Cedar Rapids, Iowa
- BUNKS AND COTS**  
Ft. Pitt Bedding Co., Pittsburgh, Pa.  
Haggard & Marcusson Co., Chicago  
Southern Rome Co., Baltimore, Md.
- CABLES (See Wire and Cable)**
- CABLEWAYS, DRAGLINE**  
\*S. Flory Mfg. Co., Bangor, Pa.  
\*Link-Belt Co., Chicago  
\*Russell Grader Mfg. Co., Minneapolis  
\*Sauerman Bros., Chicago  
Mead-Morrison Mfg. Co., E. Boston, Mass.  
Street Bros. Mach. Wks., Chattanooga
- CARS FOR MOTOR TRUCKS**  
Highland Body Mfg. Co., Cincinnati, O.  
Weatherproof Body Corp., Corunna, Mich.
- CAISSONS**  
American Bridge Co., N. Y.  
Biggs Boiler Wks., Akron, O.
- Birmingham Tank Co., Birmingham, Ala.  
Foundation Co., N. Y.  
Bethlehem Steel Co., Bethlehem, Pa.  
O'Rourke Eng. Constr. Co., N. Y.  
Petroleum Ir. Wks. Co., Sharon, Pa.
- CALCIUM CHLORIDE FOR ROADS**  
\*Dow Chemical Co., Midland, Mich.  
\*Pittsburgh Plate Glass Co., Barberton, O.  
\*Solvay Sales Corp., New York
- CANS FOR GARBAGE AND REFUSE**  
American Can Co., N. Y.  
Butler Mfg. Co., Minneapolis  
Canton Art Metal Co., Canton, O.  
Economy Baker Co., Ann Arbor, Mich.  
Rochester Can Co., Rochester, N. Y.  
Solar-Stargus Mfg. Co., Melrose Pk., Ill.  
Steel Basket Co., Cedar Rapids, Ia.
- CARBIC LIGHTS**  
\*Alexander Milburn Co., Baltimore, Md.  
\*National Carbide Sales Corp., New York
- CAR UNLOADERS (See Loaders)**
- CARS, INDUSTRIAL V. DUMPING**  
\*Insley Mfg. Co., Indianapolis, Ind.  
\*Lakewood Eng. Co., Cleveland, O.  
Atlas Car & Mfg. Co., Cleveland, O.  
Austin Mfg. Co., Chicago  
Chase Fdry. & Mfg. Co., Columbus, O.  
Easton Car & Const. Co., Easton, Pa.  
C. W. Hunt Co., New Brighton, N. Y.  
Koppel Ind. Car & Equip. Co., Koppel, Pa.  
G. L. Steubner Ir. Wks., Inc., Long Island City, N. Y.  
United Ir. Wks. Inc., Kans. City, Mo.  
Weller Mfg. Co., Chicago.  
Whiting Corp., Harvey, Ill.
- CARTS, CONCRETE**  
\*General Wheelbarrow Co., Cleveland, O.  
\*Insley Mfg. Co., Indianapolis, Ind.  
\*Lakewood Eng. Co., Cleveland, O.  
\*Lansing Co., Lansing, Mich.  
\*Ransome Conc. Mchv. Co., Dunellen, N. J.  
\*Sterling Wheelbarrow Co., Milwaukee  
\*Toledo Wheelbarrow Co., Toledo, O.  
\*Chattanooga Wheelbarrow Co., Chattanooga, Tenn.  
Cleveland Wheelbarrow Co., Cleveland, O.  
Easton Car & Const. Co., Easton, Pa.  
E. D. Etnyre & Co., Oregon, Ill.  
Gray Iron Fdry. Co., Reading, Pa.  
Jackson Mfg. Co., Harrisburg, Pa.  
Lee Trailer & Body Co., Plymouth, Ind.
- CAST IRON PIPE (See Pipe, Cast Iron)**
- CASTINGS, STREET AND SEWER**  
\*Central Fdry. Co., N. Y.  
\*U. S. Cast Ir. Pipe & Fdry. Co., Burlington, N. J.  
Armed Culvert Mfrs. Assn., Middletown, Pa.  
Canton Fdry. & Mach. Co., Canton, O.  
Casey-Hedges Co., Chattanooga, Tenn.  
H. W. Clark Co., Mattson, Ill.  
J. B. Clow & Sons, Chicago  
W. E. Dee Co., Chicago  
Elkhart Fdry. & Mach. Co., Elkhart, Ind.  
Gallon Ir. Wks. & Mfg. Co., Gallon, O.  
Gilbert Mfg. Co., Aberdeen, S. Dak.  
Klauser Mfg. Co., Dubuque, Ia.  
Madison Fdry. Co., Cleveland, O.  
Pechstein Iron Works, Keokuk, Ia.  
Sessions Foundry Co., Bristol, Conn.  
South Bend Fdry. Co., So. Bend, Ind.
- CATCH BASINS (See Castings, Street)**
- CATCH BASIN CLEANING OUTFITS**  
\*Mack Trucks, Inc., N. Y.  
Atia Corp., N. Y.  
Elgin Sales Corp., N. Y.  
Movakan Co., Indianapolis, Ind.
- CAULKING MACHINERY AND TOOLS**  
\*Independent Pn. Tool Co., Chicago  
Cleveland Rock Drill Co., Cleveland, O.  
Helwig Mfg. Co., St. Paul, Minn.  
Ingersoll-Rand Co., N. Y.  
Mueller Company, Decatur, Ill.
- CEILINGS, METAL**  
Burger Mfg. Co., Canton, O.  
Canton Art Metal Co., Canton, O.  
Glove Iron Roofing & Cor. Co., Cincinnati, O.  
Newport Rolling Mill Co., Newport, Ky.  
Klauser Mfg. Co., Dubuque, Ia.  
Geo. L. Mesker & Co., Evansville, Ind.  
Milwaukee Corr. Co., Milwaukee  
Republic Ir. & Stl. Co., Youngstown, O.  
Wheeling Corr. Co., Wheeling, W. Va.
- CEMENT—(P. C. stands for Portland Cement)**  
\*Pittsburgh Plate Glass Co., Barberton, O.  
Acme Cement Corp., Catskill, N. Y.  
Etna P. C. Co., Detroit, Mich.  
Alabama P. C. Co., Birmingham, Ala.  
Allentown P. C. Co., Allentown, Pa.  
Alpha P. C. Co., Easton, Pa.

\* Indicates that the manufacturer carries an advertisement. See index facing inside back cover.\*

  
better  
quicker  
cheaper

# Underground cuts Overhead

**THE** Underground Construction Company, Cicero, Illinois, used one of their Sixtys and a LaPlant-Choate Bulldozer to backfill on a big sewer job . . . sticky gumbo 24 feet wide and 12 feet high . . . toppled into the trench at the rate of nearly 300 lineal feet a day . . . a level grade left behind . . . many a contractor has been amazed at the cut in costs credited to "Caterpillar" track-type tractors and modern heavy-duty equipment.

*There is a "Caterpillar" Dealer near you.*

## CATERPILLAR TRACTOR CO.

Executive Offices: San Leandro, California, U. S. A.

Sales Offices and Factories:

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Distributing Warehouse: Albany, N. Y.

New York Office: 90 Church Street

Successor to

**BEST** C. L. Best      The Holt Manufacturing Company      **HOLT**

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**CATERPILLAR**  
REG. U. S. PAT. OFF.



# Where to Purchase

- Ash Grove Lime & P. C. Co., Kansas City, Mo.  
Atlas P. C. Co., N. Y.  
Beaver P. C. Co., Portland, Ore.  
Bessemer Limestone & C. Co., Youngstown, O.  
British Col. Cement Co., Victoria, B. C.  
Canada Cement Co., Ltd., Montreal, Canada.  
Colorado P. C. Co., Denver, Colo.  
Consolidated Cement Corp., Chicago  
Cowell P. C. Co., Cowell, Cal.  
Crescent P. C. Co., Wampum, Pa.  
Dewey P. C. Co., Kansas City, Mo.  
Diamond P. C. Co., Cleveland, O.  
Edison P. C. Co., N. Y.  
Georgia Cement & Stone Co., Birmingham, Ala.  
Giant P. C. Co., Philadelphia, Pa.  
Glens Falls P. C. Co., Glens Falls, N. Y.  
Golden State P. C. Co., Los Angeles, Cal.  
Great West P. C. Co., Kansas, C. Mo.  
Hawkeye P. C. Co., Des Moines, Ia.  
Hercules Cement Corp., Philadelphia.  
Hermitege P. C. Co., Nashville, Tenn.  
Huron P. C. Co., Detroit, Mich.  
Indiana P. C. Co., Indianapolis, Ind.  
International Cement Corp., N. Y.  
International P. C. Co., Ltd., Spokane, Wash.  
Kansas P. C. Co., Kansas City, Mo.  
Knickerbocker P. C. Co., Inc., Albany, N. Y.  
Kosmos P. C. Co., Louisville, Ky.  
La Toluca Compania de Cemento Portland, Mexico City, Mex.  
Lawrence Cement Co., New York.  
Lehigh P. C. Co., Allentown, Pa.  
Louisiana P. C. Co., New Orleans  
Louisville Cement Co., Louisville, Ky.  
Manitowoc P. C. Co., Manitowoc, Wis.  
Mariboro Cement Co., Edmonton, Can.  
Marquette Cement Mfg. Co., Chicago.  
Missouri P. C. Co., St. Louis, Mo.  
Monarch Cement Co., Humboldt, Kans.  
Monolith P. C. Co., Los Angeles, Cal.  
National Cement Co., Birmingham, Ala.  
Nazareth Cement Co., Nazareth, Pa.  
Nebraska Cement Co., Denver, Colo.  
Newago P. C. Co., Newago, Mich.  
New Egyptian P. C. Co., Detroit.  
North Amer. Cement Corp., Albany, N. Y.  
Northwestern States P. C. Co., Mason City, Ia.  
Oklahoma P. C. Co., Denver.  
Olympic P. C. Co., Ltd., Seattle  
Oregon P. C. Co., Portland, Ore.  
Pacific P. C. Co., San Francisco  
Peerless P. C. Co., Detroit, Mich.  
Penninsular P. C. Co., Cement City, Mich.  
Penn-Allen Cement Co., Nazareth, Pa.  
Pennsylvania-Dixie Cement Corp., N. Y.  
(Brands: Pennsylvania, Dexter, Penn-Allen, Royal & Clinchfield P. C.)  
Petoskey P. C. Co., Petoskey, Mich.  
Phoenix P. C. Co., Philadelphia  
P. C. Co. of Utah, Salt Lake City  
Pyramid P. C. Co., Des Moines  
Riverside P. C. Co., Los Angeles  
St. Marys Cement Co., Toronto, Can.  
San Antonio P. C. Co., San Antonio  
Sandusky Cement Co., Cleveland, O.  
Santa Cruz P. C. Co., San Francisco  
Signal Mountain P. C. Co., Chatita, Tenn.  
Southern States P. C. Co., Rockport, Ga.  
Southwest N. P. C. Co., Los Angeles, Cal.  
Standard P. C. Co., Cleveland  
Sun P. C. Co., Portland, Ore.  
Superior P. C. Co., Seattle, Wash.  
Texas P. C. Co., Dallas, Tex.  
Three Forks P. C. Co., Denver, Colo.  
Tidewater P. C. Co., Baltimore, Md.  
Trinity P. C. Co., Dallas, Tex.  
Union P. C. Co., Denver, Colo.  
U. S. P. C. Co., Denver, Colo.  
Universal P. C. Co., Chicago  
Utah Idaho Cement Co., Ogden, Utah  
Virginia P. C. Corp., Norfolk  
Vulcanite P. C. Co., Philadelphia  
Wabash P. C. Co., Detroit  
Warrior Cement Corp., Chatita, Tenn.  
Wellston Iron Furnace Co., Jackson, O.  
Weaver P. C. Co., Coldwater, Mich.  
Wyandotte P. C. Co., Detroit.
- CEMENT BLOCK MACHINES**  
\*Cement Block Machy. Co., Newark, N. J.  
Abrams Cement Tool Co., Detroit
- CEMENT GUNS**  
\*Cement-Gun Co., Allentown, Pa.
- CEMENT INSPECTION** (See Inspecting Laboratories)
- CEMENT TOOLS**  
Abrams Cement Tool Co., Detroit
- CENTRIFUGAL PUMPS** (See Pumps, Centrifugal)
- CHAINS**  
\*Link-Belt Co., Chicago  
Amer. Chain Co., Inc., Bridgeport, Conn.  
Chain Belt Co., Milwaukee, Wis.  
Columbus McKinnon Chain Co., Columbus, O.  
Diamond Chain & Mfg. Co., Indianapolis, Ind.
- Jeffrey Mfg. Co., Columbus, O.  
U. S. Chain & Forge Co., Pittsburgh, Pa.  
Webster Mfg. Co., Chicago  
Weller Mfg. Co., Chicago
- CHIMNEYS, CONCRETE**  
Heine Chimney Co., Chicago  
Rust Engineering Co., Pittsburgh, Pa.  
Weber Chimney Co., Chicago
- CHIMNEYS, RADIAL BRICK**  
Amer. Chimney Corp., N. Y.  
Continental Chimney Co., of Chi., Chicago  
Alphons Custodis Chimney Const. Co., N. Y.  
Heine Chimney Co., Chicago  
H. R. Heinicke, Inc., Indianapolis, Ind.  
M. W. Kellogg & Co., N. Y.  
Rust Eng. Co., Pittsburgh, Pa.
- CHIMNEYS, STEEL** (See Stacks, Steel)
- CHLORINATORS**  
\*Wallace & Tiernan Co., Inc., Newark, N. J.  
Paradon Eng. Co., Arlington, N. J.
- CHLORINE LIQUID**  
(See Liquid Chlorine)
- CHUTES, CONCRETE**  
\*Insley Mfg. Co., Indianapolis, Ind.  
\*Lakewood Eng. Co., Cleveland, O.  
\*Ransome Conc. Mch. Co., Dunellen, N. J.
- CLAY DIGGERS, PNEUMATIC**  
\*Independent Press. Tool Co., Chicago.  
\*Sullivan Machy. Co., Chicago  
Chicago Pneumatic Tool Co., New York  
Gardner-Denver Co., Quincy, Ill.  
Ingersoll-Rand Co., New York
- CLAY PIPE**  
(See Pipe, Vitreous Clay)
- CLIPS, WIRE ROPE**  
\*Amer. Steel & Wire Co., Chicago  
Amer. Hoist & Derrick Co., St. Paul, Minn.  
Fischer & Hayes Rope & Steel Co., Chicago  
Hazard Insulated Wire Wks., Wilkesbarre, Pa.  
Thos. Laughlin Co., Portland, Me.  
Marion Malleable Ir. Wks., Marion, Ind.  
C. M. Mockbee & Co., Cincinnati, O.  
John A. Roebeling Sons Co., Trenton, N. J.  
Upon-Walton Co., Cleveland, O.
- CLUTCHES**  
\*Link-Belt Co., Chicago  
\*Waukesha Motor Co., Waukesha, Wis.  
Brown-Lipe Gear Co., Syracuse, N. Y.  
Twin Disc Clutch Co., Racine, Wis.
- COAL AND ORE CONVEYING MCHY.**  
\*Barber-Greene Co., Aurora, Ill.  
\*Chicago Automatic Conv. Co., Chicago  
\*Fairfield Engineering Co., Marion, Ohio  
\*Good Roads Mch. Co., Kennett Sq., Pa.  
\*Lidgerwood Mfg. Co., Elizabeth, N. J.  
\*Link-Belt Co., Chicago  
Austin Mfg. Co., Chicago  
C. O. Bartlett & Snow Co., Cleveland, O.  
Chain Belt Co., Milwaukee, Wis.  
Gifford-Wood Co., Hudson, N. Y.  
Geo. Hais Mfg. Co., N. Y.  
C. W. Hunt Co., Inc., New Brighton, N. Y.  
Industrial Brownhoist Corp., Cleveland  
Jeffrey Mfg. Co., Columbus, O.  
Mead-Morrison Mfg. Co., E. Boston, Mass.  
Portable Machy. Co., Clifton, N. J.  
Robins Conv. Belt Co., N. Y.  
Jas. B. Seaverns Co., Batavia, Ill.  
Webster Mfg. Co., Chicago  
Weller Mfg. Co., Chicago
- COCKS, GURE AND CORPORAION**  
\*Union Wtr. Mtr. Co., Worcester, Mass.  
Chapman Valve Mfg. Co., Indian Orchard, Mass.  
Glauber Brass Mfg. Co., Cleveland, O.  
Haydenville Co., Haydenville, Mass.  
Hays Mfg. Co., Erie, Pa.  
Mueller Co., Decatur, Ill.
- COLLAPSIBLE HORSES**  
Taylor Collapsible Horse Co., Chicago
- COLUMN CLAMPS**  
\*Ellis & Ford Mfg. Co., Detroit, Mich.  
\*Insley Mfg. Co., Indianapolis, Ind.  
\*M. & M. Wire Clamp Co., Minneapolis  
\*Sterling Wheelbarrow Co., Milwaukee  
Fisher & Hayes Rope & Steel Co., Chicago  
Hawley Mfg. Co., Chicago  
W. A. Kuhlman & Co., Toledo, O.  
The O. D. G. Co., Owensboro, Ky.  
Victor L. Phillips Co., Kansas City, Mo.  
H. W. Roos Co., Cincinnati.  
Symons Clamp & Mfg. Co., Chicago  
Universal Form Clamp Co., Chicago
- COMPRESSORS, AIR** (See Air Compressors)
- CONCRETE BLOCK MACHINES** (See Cement Block Machines)
- CONCRETE CRIBBING**  
R-C Prod. Co., Cleveland
- CONCRETE CURING**  
\*Everlasting Paint & Sales Co., Los Angeles  
Barber Asphalt Co., Philadelphia
- CONCRETE FLOOR HARDENER**  
Anti-Hydro Waterproofing Co., Newark, N. J.  
Euclid Chemical Co., Cleveland  
General Chemical Co., N. Y.  
Genfire Steel Co., Youngstown, O.  
Granitex Corp., N. Y.  
A. C. Horn Co., L. I. City, N. Y.  
Master Builders Co., Cleveland, O.  
L. Sonneborn Sons, Inc., N. Y.  
Truscon Laboratories, Detroit
- CONCRETE HEATERS**  
\*Acroll Burner Co., West New York, N. J.  
\*Alex. Milburn Co., Baltimore, Md.  
Chausse Oil Burner Co., Elkhart, Ind.  
Hauk Mfg. Co., Brooklyn, N. Y.  
Littleford Bros., Cincinnati
- CONCRETE MIXERS**  
\*Cement Block Machy. Co., Newark, N. J.  
\*Construction Mch. Co., Waterloo, Ia.  
\*Jaeger Mach. Co., Columbus, O.  
\*Koehring Co., Milwaukee, Wis.  
\*Lakewood Eng. Co., Cleveland, O.  
\*Lansing Co., Lansing, Mich.  
\*John Lauson Mfg. Co., New Holstein, Wis.  
\*Ransome Conc. Mch. Co., Dunellen, N. J.  
\*T. L. Smith Co., Milwaukee  
Amer. Cem. Mch. Co., Inc., Keokuk, Ia.  
Anchor Mfg. Co., Chicago  
Archer Iron Wks., Chicago  
Atlas Eng. Co., Milwaukee  
Badger Con. Mixer Co., Milwaukee  
Chain Belt Co., Milwaukee, Wis.  
Cook Motor Co., Delaware, O.  
Norris K. Davis, San Francisco, Calif.  
J. B. Foote Fdry. Co., Fredericktown, O.  
Gray Iron Fdry. Co., Reading, Pa.  
Judy Mfg. Co., Centerville, Ia.  
Knickerbocker Co., Jackson, Mich.  
Kiel Mach. Co., Kiel, Wis.  
Kwik-Mix Concrete Mixer Co., Port Washington, Wis.  
Leach Co., Oshkosh, Wis.  
Marsh-Capron Co., Chicago  
Mixermobile Co., Milwaukee  
Orr & Sembower, Reading, Pa.  
Raber & Lang Mfg. Co., Kendallville, Ind.  
Remmel Mfg. Co., Kewaskum, Wis.  
Republic Iron Wks., Tecumseh, Mich.  
Standard Scale & Sup. Corp., Pittsburgh
- CONCRETE PAVERS**  
\*Jaeger Mach. Co., Columbus, O.  
\*Koehring Co., Milwaukee  
\*Lakewood Eng. Co., Cleveland, O.  
\*Ransome Conc. Mch. Co., Dunellen, N. J.  
\*T. L. Smith Co., Milwaukee  
Foote Co., Nunda, N. Y.
- CONCRETE PILING** (See Piling)
- CONCRETE PIPE** (See Pipe, Concrete)
- CONCRETE REINFORCEMENT**  
\*American Steel & Wire Co., Chicago  
\*Truscon Steel Co., Youngstown, O.  
Bethlehem Steel Co., Bethlehem, Pa.  
Carnegie Steel Co., Pittsburgh, Pa.  
Concrete Steel Co., N. Y.  
Consolidated Exp. Metal Co., Wheeling, W. Va.  
Electric Welding Co., Pittsburgh, Pa.  
Ft. Pitt Bridge Wks., Pittsburgh, Pa.  
Genfire Steel Co., Youngstown, O.  
Inland Steel Co., Chicago  
Kalman Steel Co., Chicago  
Laclede Steel Co., St. Louis, Mo.  
National Steel Fabric Co., Pittsburgh  
Republic Ir. & Stl. Co., Youngstown, O.  
J. T. Ryerson & Son, Chicago  
Wickwire-Spencer Steel Co., N. Y.  
Youngstown Pressed Steel Co., Warren, O.
- CONCRETE ROAD FINISHERS**  
\*A. W. French & Co., Chicago  
\*Heltzel Stl. Form & Iron Co., Warren, O.  
\*Lakewood Eng. Co., Cleveland, O.
- CONCRETE SURFACING MACHINES**  
\*Concrete Surfacing Machy. Co., Cincinnati, O.  
Ingersoll-Rand Co., New York  
Tousley Tool Co., Cleveland, Ohio
- CONCRETE TOOLS**  
The Dallett Co., Philadelphia
- CONDENSERS**  
Allis-Chalmers Mfg. Co., Milwaukee  
Ingersoll-Rand Co., N. Y.  
Westinghouse Elec. & Mfg. Co., E. Pittsburgh, Pa.  
Wheeler Cond. & Eng. Co., Carteret, N. J.  
Worthington Pump & Machy. Corp., N. Y.

If you find any errors or omissions in this Where to Purchase list, please send corrections to CONTRACTORS AND ENGINEERS MONTHLY

# "Another machine on this job couldn't get out $\frac{1}{3}$ the yardage"

And they report: "We used a Gas+Air BUCYRUS-ERIE loading clay, digging as high as 36,000 yards per month without blasting. This tough clay is about the same as hardpan to dig, and another gas shovel we tried couldn't get out one-third this yardage. Digging reservoirs in boulders and hard blue clay, our Gas+Air has loaded 136 to 185 five and eight-yard trucks in a day."

When you're using the Gas+Air BUCYRUS-ERIE you can get a Big Output in hard digging as well as easy. This gas shovel can use FULL POWER on the crowd and swing, without stealing any power whatever from the hoist. The direct-connected air engines for crowding and swinging give unequalled digging power—and more speed, too.

Repeat orders for Gas+Air BUCYRUS-ERIES tell the story!

## BUCYRUS-ERIE COMPANY

Plants: South Milwaukee, Wis., Erie, Pa., Evansville, Ind.  
General Sales Offices: South Milwaukee, Wis., Erie, Pa.

Their first Gas+Air BUCYRUS-ERIE—in 17 months of hard digging—proved far superior. So the Ventura Excavating Co., Ventura, Calif.—

# bought another Gas+Air BUCYRUS-ERIE

"BUCYRUS" and "ERIE"—each the most successful manufacturer in its particular field—consolidated Jan. 1, 1928. The unmatched resources of BUCYRUS-ERIE assure the buyer of Unequalled Value, More Efficient Machines, Permanence of the Manufacture, and a more Complete Field Service.



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Representatives throughout the U. S. A. and Canada

Offices and agencies in all the principal countries throughout the world

Do you mention the CONTRACTORS AND ENGINEERS MONTHLY when writing? Please do.

# Where to Purchase

## CONDUIT RODS

F. Bissell Co., Toledo, O.  
Turbine Sewer Mch. Co., Milwaukee  
Waldo Bros. & Bond Co., Boston

## CONDUITS, UNDERGROUND

Amer. Vitr. Products Co., Akron, O.  
Johns-Manville, Inc., N. Y.  
National Fireproofing Co., N. Y.  
Rie-wil Co., Cleveland

## CONTRACTORS' EQUIPMENT DEALERS (See

Pages 107 to 128

## CONVEYORS, BELT

\*Austin-Western Rd. Mch. Co., Chicago  
\*Barber-Greene Co., Aurora, Ill.  
\*The Burch Corp., Crestline, Ohio  
\*Chicago Automatic Conv. Co., Chicago  
\*Fairfield Engineering Co., Marion, Ohio  
\*Good Rds. Mch. Co., Kennett Sq., Pa.  
\*Jos. Honhorst Co., Cincinnati  
\*Link-Belt Co., Chicago  
\*Russell Grader Mfg. Co., Minneapolis  
Atlas Eng. Co., Milwaukee  
Austin Mfg. Co., Chicago  
C. O. Bartlett & Snow Co., Cleveland  
Chain Belt Co., Milwaukee, Wis.  
Gallon Iron Wks. & Mfg. Co., Gallon, Ohio  
Gifford Wood Co., Hudson, N. Y.  
Geo. Haisz Mfg. Co., N. Y.  
Industrial Brownhoist Corp., Cleveland  
Jeffrey Mfg. Co., Columbus, O.  
New Holland Mch. Co., N. Holland, Pa.  
Northern Conveyor Co., Janesville, Wis.  
Portable Machinery Co., Clifton, N. J.  
Samuel Olson & Co., Chicago  
Robins Conv. Belt Co., N. Y.  
Jas. B. Seaverns Co., Batavia, Ill.  
Smith Eng. Wks., Milwaukee  
Standard Conv. Co., No. St. Paul, Minn.  
Stephens-Adamsen Mfg. Co., Aurora, Ill.  
Universal Crusher Co., Cedar Rapids, Ia.  
Webster Mfg. Co., Chicago  
Weller Mfg. Co., Chicago

## CONVEYORS, BUCKET

\*Chicago Automatic Conv. Co., Chicago  
\*Fairfield Engineering Co., Marion, Ohio  
\*Good Rds. Mch. Co., Kennett Sq., Pa.  
\*Jos. Honhorst Co., Cincinnati, O.  
\*Link-Belt Co., Chicago  
\*Russell Grader Mfg. Co., Minneapolis  
Atlas Eng. Co., Milwaukee  
Austin Mfg. Co., Chicago  
C. O. Bartlett & Snow Co., Cleveland, O.  
H. W. Caldwell & Son, Chicago  
Chain Belt Co., Milwaukee  
Gifford Wood Co., Hudson, N. Y.  
Godfrey Conv. Co., Elkhart, Ind.  
Guarantee Constn. Co., N. Y.  
Geo. Haisz Mfg. Co., N. Y.  
Industrial Brownhoist Corp., Cleveland  
Jeffrey Mfg. Co., Columbus, O.  
Mead-Morrison Mfg. Co., E. Boston, Mass.  
New Holland Mch. Co., N. Holland, Pa.  
Samuel Olson & Co., Chicago  
Republic Rubber Co., Youngstown, O.  
Robins Conv. Belt Co., N. Y.  
Jas. B. Seaverns Co., Batavia, Ill.  
Stephens-Adamsen Mfg. Co., Aurora, Ill.  
Universal Crusher Co., Cedar Rapids, Ia.  
Webster Mfg. Co., Chicago  
Weller Mfg. Co., Chicago

## CONVEYORS, GRAVITY

Lamson Co., Syracuse, N. Y.  
Logan Co., Louisville, Ky.  
Mathews Conveyor Co., Elwood City, Pa.  
Standard Conv. Co., No. St. Paul, Minn.

## COUPLINGS, ROSE

Cleveland Pneum. Tool Co., Cleveland, O.  
Gilman Mfg. Co., East Boston, Mass.  
Hardison Wonder Dr. Co., Ottumwa, Ia.  
Ingersoll-Rand Co., N. Y.  
W. H. Keller, Inc., Grand Haven, Mich.  
Malconroy Co., Philadelphia

## CRANES, CRAWLER

\*Bucyrus-Erie Co., Erie, Pa.  
\*Byers Mach. Co., Ravenna, O.  
\*Link-Belt Co., Chicago  
\*Star Drilling Mach. Co., Akron, O.  
\*The Shovel Co., Lorain, Ohio  
Austin Machy. Corp., Muskegon, Mich.  
Industrial Brownhoist Corp., Cleveland  
McMyler Interstate Co., Cleveland  
Mead-Morrison Mfg. Co., Boston  
Orton Crane & Shovel Co., Chicago  
Osgood Co., Marion, Ohio  
Universal Crane Co., Cleveland

## CRANES, LOCOMOTIVE

\*Bay City Dredge Wks., Bay City, Mich.  
\*Bucyrus-Erie Co., Erie, Pa.  
\*Koehring Co., Milwaukee  
\*Link-Belt Co., Chicago  
\*Parsons Co., Newton, Iowa  
\*The Shovel Co., Lorain, O.  
Amer. Hst. & Derrick Co., St. Paul, Minn.  
Browning Crane Co., Cleveland, O.  
Davenport Loc. Wks., Davenport, Ia.

Industrial Brownhoist Corp., Cleveland  
Loc. Crane Co. of Amer., Champaign, Ill.  
Marion Steam Shovel Co., Marion, O.  
McMyler Interstate Co., Cleveland, O.  
Mead-Morrison Mfg. Co., Boston  
Moore Speedcrane Co., Chicago  
Northwest Eng. Wks., Chicago  
Ohio Loc. Crane Co., Bucyrus, O.  
Orton Crane & Shovel Co., Chicago  
Jas. B. Seaverns Co., Batavia, Ill.  
Speeder Mch. Corp., Cedar Rapids, Ia.  
U. S. Crane Co., Chicago

## CRANES, ONE-TON

\*Sterling Tractor Equipment Co., New York  
\*Whitehead & Kales Co., Detroit, Mich.  
Hughes-Keenan Co., Mansfield, O.  
Otis Eng. Co., New York

## CRANES, OVERHEAD TRAVELING

\*Curtis Pa. Mach. Co., St. Louis  
Alliance Mach. Co., Alliance, O.  
Chesapeake Iron Wks., Baltimore, Md.  
Chisholm-Moore Mfg. Co., Cleveland  
Harnischfeger Corp., Milwaukee, Wis.  
Milwaukee Elec. Crane Co., Milwaukee  
Morgan Eng. Co., Alliance, O.  
Northern Eng. Wks., Detroit, Mich.  
Shaw Crane Wks., Muskegon, Mich.  
Shepard Elec. Cr. & Hst. Co., Montour Falls, N. Y.  
Toledo Crane Co., Bucyrus, O.  
Whiting Fdry. & Equip. Co., Harvey, Ill.

## CRANES, TRUCK

\*Byers Mach. Co., Ravenna, O.  
\*Ersted Mfg. Co., Portland, Ore.  
\*Universal Crane Co., Cleveland  
Atlas Corp., New York  
Bay City Fdry. & Mach. Co., Bay City, Mich.  
Browning Crane Co., Cleveland  
Harnischfeger Corp., Milwaukee, Wis.  
Orton Crane & Shovel Co., Chicago

## CRANES, WRECKING

\*Bucyrus-Erie Co., Erie, Pa.  
Industrial Wks., Bay City, Mich.

## CRAWLER ATTACHMENTS

\*Link-Belt Co., Chicago  
\*Trackson Co., Milwaukee, Wis.  
Belle City Mfg. Co., Racine, Wis.  
Geo. Haisz Mfg. Co., N. Y.

## CRESOTED BLOCKS, TIMBER, ETC.

Amer. Creos. Co., Inc., Louisville, Ky.  
Amer. Creos. Wks., Inc., N. Orleans, La.  
Carter Bloxomend Flooring Co., K. City, Mo.  
Colonial Creos. Co., Inc., Louisville, Ky.  
Compressed Wood Preserving Co., Cincinnati, O.  
Creos. Materials Co., N. Orleans, La.  
Georgia Creos. Co., Louisville, Ky.  
Jennison-Wright Co., Toledo, O.  
Long Bell Lumber Co., Kansas City, Mo.  
Midland Creos. Co., Granite City, Ill.  
Pensacola Creosoting Co., Pensacola, Fla.  
Republic Creos. Co., Indianapolis, Ind.  
Southern Wood Pres. Co., Atlanta, Ga.  
Wyckoff Pipe & Creos. Co., N. Y.

## CRESOTING AND CRESOTING OILS

\*Barrett Co., N. Y.  
Amer. Creos. Wks., Inc., N. Orleans, La.  
Amer. Tar Prods. Co., Pittsburgh, Pa.  
Jennison-Wright Co., Toledo, O.  
Southern Creos. Co., Slidell, La.  
Southern Pavg. Const. Co., Chattanooga  
Wyckoff Pipe & Creos. Co., N. Y.

## CRUSHERS, ROCK

\*Acme Rd. Machy. Co., Frankfort, N. Y.  
\*Austin-Western Rd. Mach. Co., Chicago  
\*Good Rds. Machy. Co., Kennett Sq., Pa.  
\*Russell Grader Mfg. Co., Minneapolis  
Austin Mfg. Co., Chicago  
Gallon Ir. Wks. & Mfg. Co., Gallon, O.  
New England Road Machy. Co., So. Boston, Mass.  
New Holland Mach. Co., New Holland, Pa.  
Smith Eng. Wks., Milwaukee  
Sturtevant Mtl. Co., Boston  
Universal Crusher Co., Cedar Rapids, Ia.  
Universal Rd. Mch. Co., Kingston, N. Y.

## CULVERTS, CAST IRON

\*U. S. C. I. Pipe & Fdry. Co., Burlington, N. J.  
American Castng. Co., Birmingham, Ala.  
Amer. C. I. Pipe Co., Birmingham, Ala.  
Beach Mfg. Co., Charlotte, Mich.  
Gallon Iron Wks. & Mfg. Co., Gallon, O.  
Gilbert Mfg. Co., Aberdeen, S. D.  
R. D. Wood & Co., Philadelphia

## CULVERTS, CORRUGATED METAL

\*Austin-Western Rd. Mach. Co., Chicago  
\*Good Rds. Mach. Co., Kennett Sq., Pa.  
American Castng. Co., Birmingham, Ala.  
Arnee Culvert Mfrs. Assn., Middletown, O.  
Austin Mfg. Co., Chicago  
Bark River Bridge & Culv. Co., Bark River, Mich.  
Beach Mfg. Co., Charlotte, Mich.  
Berger Mfg. Co., Jacksonville, Fla.

Boardman Co., Okla. City, Okla.  
Burnham Mfg. Co., Woods Cross, Utah  
Calif. Corr. Culv. Co., W. Berkeley, Cal.  
Canada Ingot Ir. Co., Ltd., Guelph, Ont.  
Canton Culv. & Sile Co., Canton, O.  
Corr. Culv. Co., Moberly, Mo.  
Dixie Culv. & Metal Co., Atlanta, Ga.  
Dixie Culv. Mfg. Co., Little Rock, Ark.  
Gallon Iron Wks. & Mfg. Co., Gallon, O.  
Gilbert Mfg. Co., Aberdeen, S. D.  
R. Hardesty Mfg. Co., Denver, Colo.  
Highway Prod. & Mfg. Co., Elmira, N. Y.  
Ind. Corr. Culv. Co., Mason City, Ia.  
Iowa Pure Ir. Co., Des Moines, Ia.  
Kentucky Culvert Mfg. Co., Louisville, Ky.  
Klauser Mfg. Co., Dubuque, Ia.  
Lyle Culv. & Rd. Equip. Co., Minneapolis, Minn.  
Md. Culv. & Metal Co., Baltimore  
N. E. Metal Culv. Co., Palmer, Mass.  
Nebraska Culv. & Mfg. Co., Wahoo, Neb.  
New England Metal Culvert Co., Nashua, N. H.  
Newport Culvert Co., Newport, Ky.  
Northfield Ir. Co., Northfield, Minn.  
Northwestern Sheet & Ir. Wks., Wapeton, N. D.  
Ohio Corr. Culv. Co., Middletown, O.  
W. Q. O'Neill Co., Crawfordsville, Ind.  
Pare Iron Culvert & Mfg. Co., Portland, Ore.  
Road Supply & Metal Co., Topeka, Kan.  
St. Louis Metal Culv. Co., St. Louis, Mo.  
So. Metal Culv. Co., Salisbury, N. C.  
Spokane Culv. & Tank Co., Spokane  
Tenn. Metal Culv. Co., Nashville  
U. S. Br. & Culv. Co., Bay City, Mich.  
Virginia Culvert Corp., Roanoke, Va.  
Western Metal Mfg. Co., Houston, Tex.  
Wheeling Corr. Co., Wheeling, W. Va.  
Wyatt Metal & Bir. Wks., Dallas, Tex.

## CULVERT FORMS

Concrete Form Co., Inc., Syracuse, N. Y.  
Northfield Iron Co., Northfield, Minn.

## CUBE BOXES

Casey-Hedges Co., Chattanooga, Tenn.  
H. W. Clark Co., Mattoon, Ill.  
J. B. Clow & Sons, Chicago  
Madison Fdry. Co., Cleveland, O.  
Mueller Co., Decatur, Ill.

## CUBE, GUTTER AND BASE FORMS (See

Forms, Concrete)

## CUBE GUARDS, STEEL

W. S. Godwin Co., Baltimore

## CUBE, STEEL PROTECTED

\*Truscon Steel Co., Youngstown, O.  
Concrete Steel Co., N. Y.

## CURING OF CONCRETE

\*Dow Chemical Co., Midland, Mich.  
\*Pittsburgh Plate Glass Co., Barberton, Ohio  
\*Solvay Sales Corp., N. Y.

## CUTTERS, PIPE, HAND

\*Ellis & Ford Mfg. Co., Detroit  
Armstrong Mfg. Co., Bridgeport, Ct.  
Barnes Tool Co., New Haven, Ct.  
Erie Tool Works, Erie, Pa.  
Greenfield Tap & Die Corp., Greenfield, Mass.  
Oswego Tool Co., Oswego, N. Y.  
Reed Mfg. Co., Erie, Pa.  
Walworth Mfg. Co., Boston

## CUTTERS, ROD AND WIRE

\*Koehring Co., Milwaukee, Wis.  
\*M. & M. Wire Clamp Co., Minneapolis  
\*W. D. Starratt Metal Cutting Products Co., San Francisco  
Buffalo Forge Co., Buffalo, N. Y.  
Carulus Mfg. Co., Sterling, Ill.  
C. D. Edwards Mfg. Co., Albert Lee, Minn.  
Helwig Mfg. Co., St. Paul, Minn.  
Worthington Pump & Mch. Corp., N. Y.

## CUTTING EDGES

\*Russell Grader Mfg. Co., Minneapolis  
J. D. Adams & Co., Indianapolis, Ind.  
Shunk Mfg. Co., Bucyrus, O.

## CUTTING AND WELDING APPARATUS (See

Welding Apparatus)

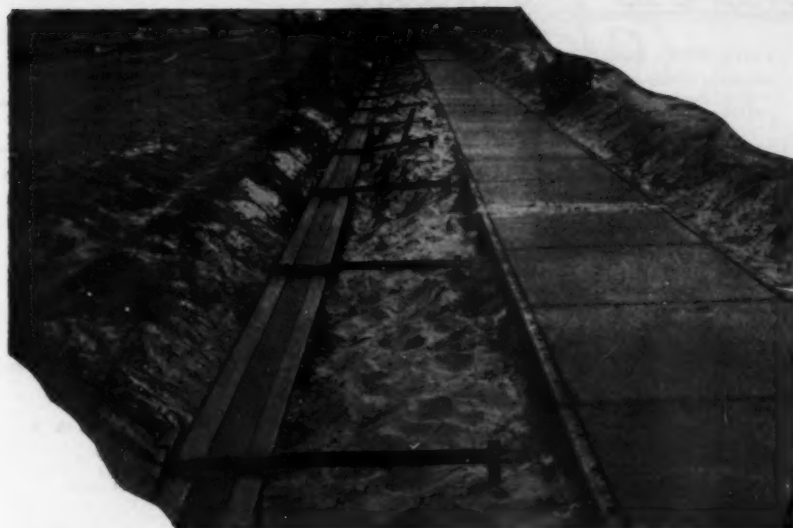
## CYLINDER HEADS, RICARDO

\*Waukesha Motor Co., Waukesha, Wis.

## DERRICKS, GUY AND STIFF-LEG

\*Clyde Ir. Wks. Sales Co., Duluth, Minn.  
\*Dobbie Fdry. & Mach. Co., Niagara Falls, N. Y.  
\*S. Flery Mfg. Co., Bangor, Pa.  
\*Insley Mfg. Co., Indianapolis, Ind.  
\*Lidgerwood Mfg. Co., Elizabeth, N. J.  
\*Mundy Sales Corp., N. Y.  
\*Sagson Derrick Co., Chicago  
Amer. Hst. & Derrick Co., St. Paul, Minn.  
John T. Horton Co., N. Y.  
Lakeland Bridge & Steel Co., N. Milwaukee, Wis.  
National Hstg. Eng. Co., Harrison, N. J.  
Street Bros. Mach. Wks., Chattanooga  
Superior Iron Wks., Superior, Wis.  
Universal Hstg. Machy. Corp., Buffalo.





## 200,000 linear yards of Curb and Sidewalk on this Heltzel Equipped Job

The curb forms are HELTZEL yoke type.

On each end of the curb rails is angle steel with drilled holes. Lugs on both sides of the yoke align with these holes, the yoke supporting the rails and affording positive alignment of the form. The division plates slide down inside the yokes at each rail intersection. Clearance is provided under the yoke for the use of finishing tools.

To assemble—set the front and back rails, slip the yoke into place and insert the division plates.

Adjustable lateral braces attached to yokes hold form in position.

HELTZEL straight and battered curb forms are also manufactured with sleeve type of joints and with long winged division plates which extend through slots in the front and back rails the full depth of the rail to prevent spreading. With all types of HELTZEL Curb Forms the division plates can be removed without disturbing the side rails.

Check the coupon for HELTZEL Catalogue of Curb, Curb and Gutter, and Sidewalk Forms.

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*Manufacturers of Steel Road Forms, Steel Curb Forms, Steel Curb and Gutter Forms, Steel Sidewalk Forms, Mixing Boxes, Agrabatchers, Trailer Bins, Stationery Bins, Man-hole Forms, Sewer Forms, Pipe Forms, Finishing Machines, Strickoffs, Trail Graders, Subgrade Testers, Traveling Bridges, Car Unloaders, Steel Mortar Boxes, Steel Tool Boxes, Joint Machines.*

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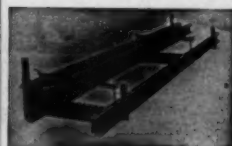
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# Where to Purchase

## DERRICKS, PIPE LAYING

- \*Debbie Fdry. & Mach. Co., Niagara Falls
- \*Lidgerwood Mfg. Co., Elizabeth, N. J.
- Street Bros. Mach. Wks., Chattanooga

## DERRICKS, REVOLVING

- \*Glyde Ir. Wks. Sales Co., Duluth, Minn.
- \*Debbie Fdry. & Mach. Co., Niagara Falls
- Street Bros. Mach. Wks., Chattanooga

## DERRICKS, STEEL

- \*Glyde Ir. Wks. Sales Co., Duluth, Minn.
- \*Debbie Fdry. & Mach. Co., Niagara Falls
- \*Hayward Co., N. Y.
- \*Inley Mfg. Co., Indianapolis, Ind.
- Amer. Hst. & Derrick Co., St. Paul
- Street Bros. Mach. Wks., Chattanooga
- Taylor Port. St. Derrick Co., Chicago

## DERRICKS, STEEL PORTABLE

- \*Glyde Ir. Wks. Sales Co., Duluth, Minn.
- \*Debbie Fdry. & Mach. Co., Niagara Falls
- \*Lidgerwood Mfg. Co., Elizabeth, N. J.
- Amer. Hst. & Derrick Co., St. Paul
- Atla Corp., New York
- Street Bros. Mach. Wks., Chattanooga

## DERRICKS, TRAVELING

- \*Bay City Dredge Wks., Bay City, Mich.
- \*Glyde Ir. Wks. Sales Co., Duluth, Minn.
- \*Debbie Fdry. & Mach. Co., Niagara Falls
- \*Hayward Co., N. Y.
- Amer. Hst. & Derrick Co., St. Paul
- Nat'l. Hstg. Eng. Co., Harrison, N. J.
- Orton Crane & Shovel Co., Chicago
- Street Bros. Mach. Wks., Chattanooga

## DERRICK FITTINGS

- \*S. Flory Mfg. Co., Bangor, Pa.
- \*Hayward Co., N. Y.
- \*Lidgerwood Mfg. Co., Elizabeth, N. J.
- \*Mundy Sales Corp., N. Y.
- Amer. Hst. & Derrick Co., St. Paul
- Street Bros. Mach. Wks., Chattanooga

## DIAPHRAGM PUMPING OUTFITS

- \*John Lauson Mfg. Co., New Holstein, Wis.

## DIESEL ENGINES (See Engines, Oil)

## DISTRIBUTORS, TAR AND ASPHALT

- \*Kinney Mfg. Co., Boston
- E. D. Etayre & Co., Oregon, Ill.
- Municipal Supply Co., So. Bend, Ind.

## DISTRIBUTING PLANTS, CONCRETE

- \*Inley Mfg. Co., Indianapolis, Ind.
- \*Lakewood Eng. Co., Cleveland, O.
- \*Ransome Conc. Mch. Co., Danellen, N. J.

## DITCHING MACHINES (See Excavators)

## DOORS AND SHUTTERS, STEEL ROLLING

- Cornell Iron Wks., B'lym, N. Y.
- Kinney Mfg. Co., Columbus, O.
- Variety Fire Door Co., Chicago
- J. G. Wilson Corp., N. Y.

## DRAFTING MACHINES

- Univ. Drafting Mach. Co., Cleveland, O.

## DREDGES

- \*Bay City Dredge Wks., Bay City, Mich.
- \*Bucyrus-Erie Co., Erie, Pa.
- \*Hayward Co., N. Y.
- Amer. Steel Dredge Co., Ft. Wayne, Ind.
- Ellicott Mach. Corp., Baltimore
- Marion Steam Shovel Co., Marion, O.
- Orion Crane & Shovel Co., Chicago
- Osgood Co., Marion, O.
- J. S. Schofield's Sons Co., Macon, Ga.
- Stockton Iron Wks., Stockton, Cal.
- Street Bros. Mach. Wks., Chattanooga
- Superior Iron Wks., Superior, Wis.

## DREDGES, DIPPER

- \*Bay City Dredge Wks., Bay City, Mich.
- \*Bucyrus-Erie Co., Erie, Pa.
- \*Link-Belt Co., Chicago
- Amer. Steel Dredge Co., Ft. Wayne, Ind.
- Marion Steam Shovel Co., Marion, O.
- Osgood Co., Marion, O.

## DREDGES, HYDRAULIC

- \*Bucyrus-Erie Co., Erie, Pa.
- Ellicott Mach. Corp., Baltimore
- Marion Steam Shovel Co., Marion, O.
- Morris Mach. Wks., Baldwinville, N. Y.

## DREDGING MACHINERY

- \*S. Flory Mfg. Co., Bangor, Pa.
- \*Lidgerwood Mfg. Co., Elizabeth, N. J.
- \*Mundy Sales Corp., N. Y.
- Street Bros. Mach. Wks., Chattanooga

## DREDGING PUMPS AND ACCESSORIES

- Erie Pump & Engine Wks., Medina, N. Y.
- Ingersoll-Rand Co., N. Y.

## DRILL STEEL SHARPENERS (See Sharpeners)

## DRILLS, CORE

- \*McKiernan-Terry Drill Co., N. Y.
- \*Sullivan Machy. Co., Chicago
- Ingersoll-Rand Co., N. Y.

## DRILLS, ROCK

- \*The Buhl Company, Chicago
- \*Sullivan Machy. Co., Chicago
- Chicago Pneumatic Tool Co., New York
- Cleveland Pneum. Tool Co., Cleveland, O.
- Cleveland Rock Drill Co., Cleveland, O.
- Dalzell Co., Philadelphia
- Gardner-Denver Co., Quincy, Ill.
- Gilman Mfg. Co., E. Boston
- Hardsoeg Wonder Drill Co., Ottumwa, Ia.
- Helwig Mfg. Co., St. Paul, Minn.
- Ingersoll-Rand Co., New York
- W. H. Keller, Inc., Grand Haven, Mich.
- Wood Drill Wks., Paterson, N. J.

## DRILLS FOR WELLS AND BLAST HOLES (See Well Drilling Machy.)

## DRUMS, HOLDING

- \*Blaw-Knox Co., Pittsburgh, Pa.
- \*Glyde Ir. Wks. Sales Co., Duluth, Minn.
- \*Debbie Fdry. & Mach. Co., Niagara Falls
- \*Hayward Co., N. Y.
- \*Helzel Steel Form & Tr. Co., Warren, O.
- Street Bros. Mach. Wks., Chattanooga

## DRYERS, ASPHALT AND CEMENT

- Allis-Chalmers Mfg. Co., Milwaukee
- Amer. Blower Co., Detroit, Mich.
- Atlas Dryer Co., Cleveland, O.
- C. O. Bartlett & Snow Co., Cleveland, O.
- F. D. Cummer & Son Co., Cleveland, O.
- Lancaster Iron Works, Inc., Lancaster, Pa.
- Mosher Mfg. Co., Chicago
- Ruggles-Coles Engineering Co., New York

## DRYERS, SAND AND GRAVEL

- \*Acordl Burner Co., West New York, N. J.
- \*Jos. Honhorst Co., Cincinnati, O.
- \*Alex. Milburn Co., Baltimore, Md.
- American Process Co., New York
- C. O. Bartlett & Snow Co., Cleveland, O.
- Chase & Lyman, Boston
- Chausse Oil Burner Co., Elkhart, Ind.
- Littleford Bros., Cincinnati, O.
- Mosher Mfg. Co., Chicago

## DUMP BODIES FOR CONCRETE

- Easton Car & Const. Co., Easton, Pa.
- Lee Trailer & Body Co., Plymouth, Ind.

## DUMP BODIES FOR MOTOR TRUCKS

- \*Holt Co., Milwaukee
- \*Highway Trailer Co., Edgerton, Wis.
- \*Mack Trucks, Inc., N. Y.
- \*Wood Hydr. Hoist & Body Co., Detroit
- Amer. Prod. & Trad. Co., Chicago
- Am. Truck & Body Co., Martinsville, Va.
- Anthony Co., Streator, Ill.
- Atla Corp., New York
- Columbia Body Corp., Columbia, Pa.
- Columbian St. Tank Co., Kansas City, Mo.
- Detroit Trailer & Mach. Co., Detroit
- Detwiler Mfg. Co., Galion, O.
- Eagle Wagon Wks., Auburn, N. Y.
- Easton Car & Const. Co., Easton, Pa.
- Galion All Steel Body Co., Galion, O.
- Griscom-Russell Co., N. Y.
- Herr Dump Car Mfg. Co., Coatesville, Pa.
- Hughes-Keenan Co., Mansfield, O.
- The Hug Co., Highland, Ill.
- Jennings Aut. Dump Body, Roanoke, Va.
- Lee Trailer & Body Co., Plymouth, Ind.
- Littleford Bros., Cincinnati, O.
- Mandt Body Co., Keokuk, Ia.
- Marion Steel Body Co., Marion, O.
- Martin-Parry Corp., York, Pa.
- N. Y. Central Ir. Wks., Hagerstown, Md.
- Pechstein Iron Wks., Keokuk, Ia.
- Stewart Iron Wks. Co., Cincinnati
- Van Dorn Iron Wks. Co., Cleveland, O.

## DUMP CARTS AND WAGONS, HORSE

- \*Acme Road Machy. Co., Frankfort, N. Y.
- \*Austin-Western Road Machy. Co., Chicago
- \*Highway Trailer Co., Edgerton, Wis.
- \*Russell Grader Mfg. Co., Minneapolis
- Acme Wagon Co., Emigsville, Pa.
- J. D. Adams & Co., Indianapolis
- Austin Mfg. Co., Chicago
- Bain Wagon Co., Kenosha, Wis.
- Columbia Body Corp., Columbia, Pa.
- Eagle Wagon Wks., Auburn, N. Y.
- Electric Wheel Co., Quincy, Ill.
- Gilbert Mfg. Co., Aberdeen, S. D.
- Hazy Wagon Co., Abingdon, Va.
- G. H. Holshog & Bro., Jeffersonville, Ind.
- LaPlant-Chaste Mfg. Co., Cedar Rapids, Iowa
- Little Red Wagon Co., Omaha, Neb.
- Loedinghaus-Eschenried Wagon Co., St. Louis
- Rex-Watson Corp., Canastota, N. Y.
- Stockland Road Machinery Co., Minneapolis
- Streich Bros., Oshkosh, Wis.
- Thornhill Wagon Co., Lynchburg, Va.
- Western Wheeled Scraper Co., Aurora, Ill.

## DUMP WAGONS (ALL STEEL), TRACTOR DRAWN

- \*Euclid Crane & Hoist Co., Euclid Village, O.
- LePlant-Chaste Mfg. Co., Cedar Rapids, Iowa
- Lenhart Wagon Co., Minneapolis

## DYNAMITE (See Explosives)

## EJECTORS, SEWAGE (See Sewage Ejectors)

## ELECTRIC GENERATORS AND MOTORS

- Louis Allis Co., Milwaukee
- Allis-Chalmers Mfg. Co., Milwaukee
- Crocker-Wheeler Co., Ampers, N. J.
- Fairbanks, Morse & Co., Chicago
- General Electric Co., Schenectady, N. Y.
- Graybar Electric Co., New York
- Ideal Electric & Mfg. Co., Mansfield, O.
- Lincoln Electric Co., Cleveland, O.
- Robbins & Myers Co., Springfield, O.
- Wagner Electric Mfg. Co., St. Louis
- Westinghouse Electric & Mfg. Co., E. Pittsburgh, Pa.

## ELECTRIC LAMPS

- General Electric Co., Schenectady, N. Y.
- Westinghouse Lamp Co., N. Y.

## ELECTRIC LIGHTING PLANTS

- Allis-Chalmers Mfg. Co., Milwaukee
- Climax Eng. Co., Clinton, Ia.
- Cook Motor Co., Delaware, O.
- Cushman Motor Works, Lincoln, Neb.
- Fairbanks, Morse & Co., Chicago
- Fuller & Johnson Mfg. Co., Madison, Wis.
- General Electric Co., Schenectady, N. Y.
- Graybar Electric Co., New York
- Kohler Co., Kohler, Wis.
- Klauer Mfg. Co., Dubuque, Iowa
- Westinghouse Electric & Mfg. Co., E. Pittsburgh, Pa.

## ELECTRIC TRANSFORMERS

- Allis-Chalmers Mfg. Co., Milwaukee
- General Electric Co., Schenectady, N. Y.
- Kuhlman Electric Co., Bay City, Mich.
- Westinghouse Electric & Mfg. Co., E. Pittsburgh, Pa.

## ELECTRIC WIRES (See Wire)

## ELEVATORS, BUCKET

- \*Austin-Western Rd. Machy. Co., Chicago
- \*Good Rds. Machy. Co., Kennett Sq., Pa.
- \*Fairfield Engineering Co., Marion, Ohio
- \*Link-Belt Co., Chicago
- \*Russell Grader Mfg. Co., Minneapolis
- Abrams Cement Tool Co., Detroit
- Atlas Eng. Co., Milwaukee
- Austin Mfg. Co., Chicago
- C. O. Bartlett & Snow Co., Cleveland, O.
- Chain Belt Co., Milwaukee, Wis.
- Gifford-Wood Co., Hudson, N. Y.
- Geo. Haiss Mfg. Co., N. Y.
- Industrial Brownhoist Corp., Cleveland
- Jeffrey Mfg. Co., Columbus, O.
- Littleford Bros., Cincinnati
- New Holland Mch. Co., N. Holland, Pa.
- Robins Convertible Belting Co., N. Y.
- Sears-Wells Machy. Co., Oakland, Cal.
- Stephens-Adams Mfg. Co., Aurora, Ill.
- Univ. Rd. Machy. Co., Kingston, N. Y.
- Webster Mfg. Co., Chicago
- Weller Mfg. Co., Chicago
- Worthington Pump & Mch. Corp., N. Y.

## ELEVATORS, PASSENGER, FREIGHT, ETC.

- Am. Elev. & Mach. Co., Louisville, Ky.
- Atlantic Elev. Co., Inc., Philadelphia
- Bay State Elev. Co., Springfield, Mass.
- Haughton Elev. & Mach. Co., Toledo, O.
- Kaesner & Hecht Co., Chicago
- Llewellyn Ir. Wks., Los Angeles, Cal.
- Montgomery Elevator Co., Moline, Ill.
- Oliver Elevator Co., N. Y.
- C. Ridgway & Son Co., Coatesville, Pa.
- A. B. See Electric Elevator Co., N. Y.
- Spindel Elevator Corp., Reading, Pa.
- Warner Elevator Mfg. Co., Cincinnati
- Warsaw Elevator Co., Warsaw, N. Y.

## ENGINE DREDGING

- Murray Iron Works Co., Burlington, Ia.

## ENGINES, FORD REPLACEMENT

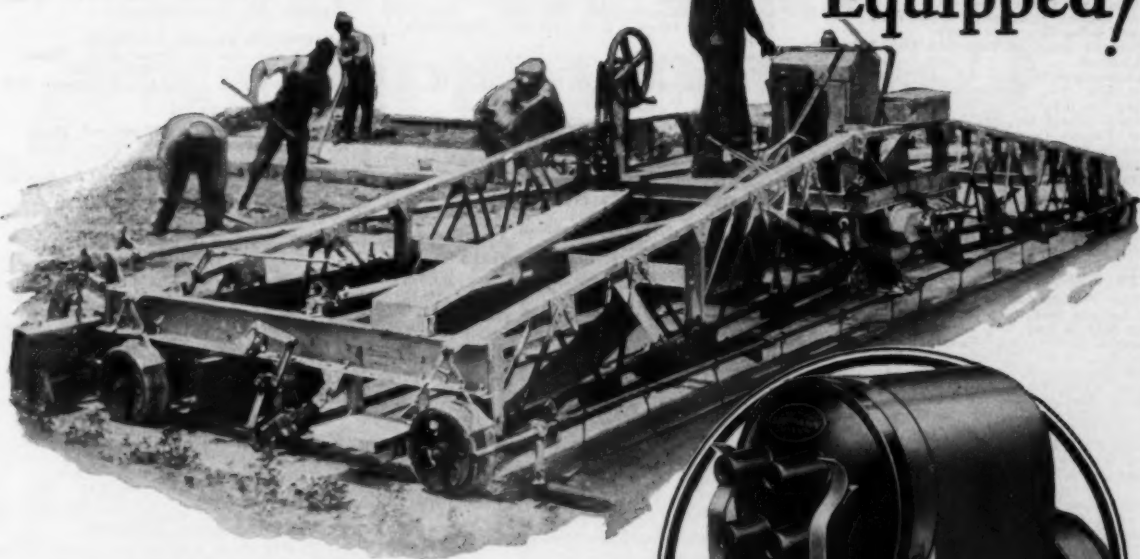
- \*Waukesha Motor Co., Waukesha, Wis.

## ENGINES, GAS AND GASOLINE

- \*Caterpillar Tractor Co., San Leandro, Cal.
- \*Continental Motors Corp., Muskegon, Mich.
- \*Domestic Eng. & Pump Co., Shippensburg, Pa.
- \*Erted Mfg. Co., Portland, Ore.
- \*Hercules Motors Corp., Canton, O.
- \*John Lauson Mfg. Co., New Holstein, Wis.
- \*Le Roi Co., Milwaukee
- \*Link-Belt Co., Chicago
- \*Novo Engine Co., Lansing, Mich.

# LAKEWOOD

## Finishers & Mixers are Eisemann Equipped!

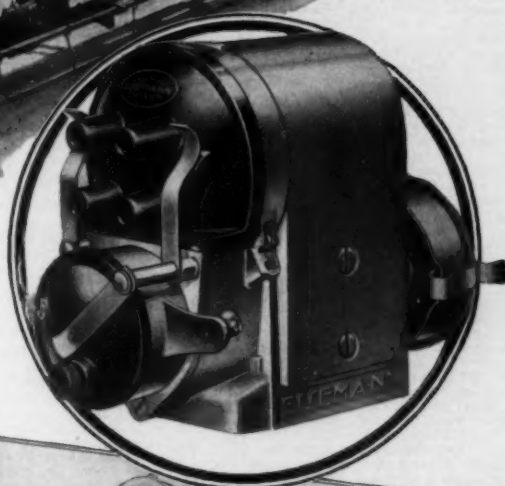


The same high quality magneto is to be found on the modern mechanical screed pictured above as is supplied with all Lakewood Concrete Mixers.

A second-rate magneto is not good enough for any piece of equipment built by the Lakewood Engineering Company.

Simple . . . Rugged . . . Water-proof . . . Dust-proof . . . Easy starting . . . Trouble-free . . . These are the reasons why Eisemann Magnetos are so universally used by makers of quality construction equipment.

EISEMANN MAGNETO CORPORATION  
165 Broadway - New York  
DETROIT • SAN FRANCISCO CHICAGO



# EISEMANN



# Where to Purchase

\*Stover Mfg. & Eng. Co., Freeport, Ill.  
 \*Waukesha Motor Co., Waukesha, Wis.  
 Alamo Engine Co., Hilldale, Mich.  
 Allis-Chalmers Mfg. Co., Milwaukee  
 Beaver Mfg. Co., Milwaukee, Wis.  
 Buda Co., Harvey, Ill.  
 Charter Gas Engineering Co., Sterling, Ill.  
 Chicago Pneumatic Tool Co., N. Y.  
 Climax Engineering Co., Clinton, Ia.  
 Cook Motor Co., Delaware, O.  
 Cushman Motor Works, Lincoln, Neb.  
 Electric Wheel Co., Quincy, Ill.  
 Evinrude Motor Co., Milwaukee  
 Fairbanks Morse & Co., Chicago  
 Foss Gas Engineering Co., Springfield, O.  
 Fuller & Johnson Mfg. Co., Madison, Wis.  
 Hinkley Motors, Inc., Detroit  
 F. Van Rossum Hoogendyk, New York  
 Ingersoll-Rand Co., New York  
 Minneapolis Steel & Machinery Co., Minneapolis, Minn.  
 Sanderson-Cyclone Drill Co., Orrville, O.  
 Servel Mfg. Co., Evansville, Ind.  
 Sterling Engine Co., Buffalo, N. Y.  
 Universal Motor Co., Oshkosh, Wis.  
 Weber Engine Co., Kansas City, Mo.  
 Wisconsin Motor Mfg. Co., Milwaukee  
 Witte Engine Works, Kansas City, Mo.  
 Worthington Pump & Mch. Corp., N. Y.

## ENGINES, HOISTING (See Hoists)

## ENGINES, INDUSTRIAL (See Power Plants, Industrial)

## ENGINES, KEROSENE

\*Hercules Motors Corp., Canton, O.  
 \*John Lanson Mfg. Co., New Holstein, Wis.  
 \*Stover Mfg. & Eng. Co., Freeport, Ill.  
 \*Waukesha Motor Co., Waukesha, Wis.  
 Alamo Engine Co., Hilldale, Mich.  
 Climax Engineering Co., Clinton, Ia.  
 Electric Wheel Co., Quincy, Ill.  
 Fuller & Johnson Mfg. Co., Madison, Wis.  
 Witte Engine Works, Kansas City, Mo.

## ENGINES, OIL, DIESEL

\*Stover Mfg. & Eng. Co., Freeport, Ill.  
 Allis-Chalmers Mfg. Co., Milwaukee  
 Anderson Engine & Fdry. Co., Anderson, Ind.  
 Bessemer Gas Eng. Co., Grove City, Pa.  
 Bethlehem Steel Co., Bethlehem, Pa.  
 Buckeye Machinery Co., Lima, O.  
 Busch-Bulzer Bros.-Diesel Eng. Co., St. Louis.  
 Charter Gas Engineering Co., Sterling, Ill.  
 Chicago Pneumatic Tool Co., New York  
 De La Vergne Machinery Co., New York  
 Fairbanks, Morse & Co., Chicago  
 Foss Gas Engine Co., Springfield, O.  
 Fulton Iron Works Co., St. Louis  
 Ingersoll-Rand Co., New York  
 Lombard Governor Co., Ashland, Mass.  
 McIntosh & Seymour Corp., Auburn, N. Y.  
 Muncie Oil Engine Co., Muncie, Ind.  
 New London Ship & Eng. Co., Groton, Ct.  
 Nordberg Mfg. Co., Milwaukee, Wis.  
 St. Mary's Oil Eng. Co., St. Charles, Mo.  
 Taylor Machinery Co., Cleveland, O.  
 F. Van Rossum Hoogendyk, New York  
 Weber Engineering Co., Kansas City, Mo.  
 Western Machy. Co., Los Angeles, Cal.  
 Worthington Pump & Mch. Corp., N. Y.

## ENGINES, PUMPING

\*Hercules Motors Corp., Canton, O.  
 \*Stover Mfg. & Eng. Co., Freeport, Ill.  
 \*Waukesha Motor Co., Waukesha, Wis.  
 Allis-Chalmers Mfg. Co., Milwaukee  
 Climax Engineering Co., Clinton, Ia.  
 Hoover, Owens, Rentschler Co., Hamilton, O.  
 Murray Iron Works, Burlington, Ia.  
 Nordberg Mfg. Co., Milwaukee  
 Worthington Pump & Mch. Corp., N. Y.

## ENGINES, SWINGING

\*Dake Engine Co., Grand Haven, Mich.  
 \*Lidgerwood Mfg. Co., Elizabeth, N. J.  
 \*Mandy Sales Corp., N. Y.

## EXCAVATING MACHINERY (See Names Under Excavators, also Steam Shovels)

## EXCAVATORS, CABLEWAY

\*Erted Mfg. Co., Portland, Ore.  
 \*Lidgerwood Mfg. Co., Elizabeth, N. J.  
 \*Link-Belt Co., Chicago  
 \*Sauerman Bros., Inc., Chicago  
 R. H. Beaumont Co., Philadelphia  
 Street Bros. Machinery Works, Chattanooga

## EXCAVATORS, CRAWLING TRACTOR

\*Bucyrus-Erie Co., Erie, Pa.  
 \*Byers Machinery Co., Ravenna, O.  
 \*Trackson Co., Milwaukee, Wis.  
 W. M. Blair Mfg. Co., Chicago, Ill.

## EXCAVATORS, DITCH AND TRENCH

\*Barber-Greene Co., Aurora, Ill.  
 \*Bay City Dredge Works, Bay City, Mich.  
 \*Bucyrus-Erie Co., Erie, Pa.  
 \*Byers Machinery Co., Ravenna, O.  
 \*Erted Mfg. Co., Portland, Ore.  
 \*Hayward Co., New York

\*Insley Mfg. Co., Indianapolis, Ind.  
 \*Keystone Driller Co., Beaver Falls, Pa.  
 \*Lidgerwood Mfg. Co., Elizabeth, N. J.  
 \*Link-Belt Co., Chicago  
 \*Parsons Co., Newton, Ia.  
 \*Russell Grader Mfg. Co., Minneapolis  
 \*Star Drilling Machinery Co., Akron, O.  
 \*Thew Shovel Co., Lorain, O.  
 Austin Mach. Corp., Muskegon, Mich.  
 Buckeye Tractor Ditcher Co., Findlay, O.  
 Cleveland Tractor Co., Euclid, O.  
 Economy Exc. Co., Iowa Falls, Ia.  
 Industrial Brownhoist Corp., Cleveland  
 Marion Steam Shovel Co., Marion, O.  
 Monaghan Machinery Co., Chicago  
 Moore Speedcrane Co., Chicago, Ill.  
 Orton Crane & Shovel Co., Chicago  
 Osgood Co., Marion, O.  
 Owensboro Ditcher & Grader Co., Owensboro, Ky.  
 Speeder Mch. Corp., Cedar Rapids, Ia.  
 Street Bros. Machine Works, Chattanooga  
 C. T. Topping Machinery Co., Dayton, O.

## EXCAVATORS, DRAG-LINE

\*Bay City Dredge Works, Bay City, Mich.  
 \*Bucyrus-Erie Co., Erie, Pa.  
 \*Erted Mfg. Co., Portland, Ore.  
 \*Byers Machinery Co., Ravenna, O.  
 \*Hayward Co., New York  
 \*Kochring Co., Milwaukee  
 \*Lidgerwood Mfg. Co., Elizabeth, N. J.  
 \*Link-Belt Co., Chicago  
 \*Russell Grader Mfg. Co., Minneapolis  
 \*Sauerman Bros., Chicago  
 \*Star Drilling Machine Co., Akron, O.  
 \*Thew Shovel Co., Lorain, O.  
 Amer. Hoisting & Derrick Co., St. Paul  
 Austin Machy. Corp., Muskegon, Mich.  
 Browning Crane Co., Cleveland, O.  
 Economy Exc. Co., Iowa Falls, Ia.  
 C. L. Gade, Iowa Falls, Ia.  
 Gallion Iron Wks. & Mfg. Co., Gallion, O.  
 Harnischfeger Corp., Milwaukee, Wis.  
 Industrial Brownhoist Corp., Cleveland  
 Marion Steam Shovel Co., Marion, O.  
 Monaghan Machine Co., Chicago  
 Moore Speedcrane Co., Chicago  
 Orton Crane & Shovel Co., Chicago  
 Osgood Co., Marion, O.  
 Page Engineering Co., Chicago  
 Speeder Mch. Corp., Cedar Rapids, Ia.  
 Street Bros. Machine Works, Chattanooga

## EXPANDED METAL

\*Truscon Steel Co., Youngstown, O.  
 Consolidated Exp. Metal Co., Wheeling, W. Va.  
 Northwestern Exp. Metal Co., Chicago  
 Youngstown Pressed Steel Co., Warren, O.

## EXPANSION JOINT MATERIAL

\*Barrett Co., New York  
 \*Phillip Carey Co., Cincinnati, O.  
 \*Truscon Steel Co., Youngstown, O.  
 Barber Asphalt Co., Philadelphia  
 Hoosier Asphalt Co., Alexandria, Ind.  
 W. R. Meadows, Inc., Elgin, Ill.  
 Pioneer Asphalt Co., Lawrenceville, Ill.  
 Serviced Products Corp., Chicago  
 Texas Co., New York  
 Waring-Underwood Co., Philadelphia

## EXPLOSIVES

Atlas Powder Co., Wilmington, Del.  
 E. I. Du Pont de Nemours & Co., Wilmington, Del.  
 Giant Powder Co., South Francisco, Cal.  
 Grasselli Powder Co., Cleveland, O.  
 Hercules Powder Co., Wilmington, Del.

## EXTENSION FRAMES, FORD TRUCK

Swedish Crucible Steel Co., Detroit

## FENCING

\*American Steel & Wire Co., Chicago  
 Adrian Wire Fence Co., Adrian, Mich.  
 Amer. Fence & Const. Co., New York  
 Anchor Post Fence Co., New York  
 Cyclone Fence Co., Waukegan, Ill.  
 Driggins Wire Fence Co., Anderson, Ind.  
 Ill. Wire & Mfg. Co., Joliet, Ill.  
 Ind. Steel & Wire Co., Muncie, Ind.  
 Interlocking Fence Co., Morton, Ill.  
 Keystone Steel & Wire Co., Keokuk, Ill.  
 Kokomo Steel & Wire Co., Kokomo, Ind.  
 Mich. Wire Fence Co., Adrian, Mich.  
 Nitselman Bros., Muncie, Ind.  
 Page Stl. & Wire Prod. Corp., Bridgeport, Ct.  
 Pittsburgh Steel Co., Pittsburgh, Pa.  
 Stewart Ir. Wks. Co., Cincinnati, O.  
 Tex. Cyclone Fence Co., Ft. Worth, Tex.  
 Van Dorn Iron Works Co., Cleveland, O.  
 Wayne Iron Works, Wayne, Pa.  
 Wickwire-Spencer Steel Co., New York

## FILING EQUIPMENT, STEEL

Art Metal Constr. Co., Jamestown, N. J.  
 Berger Mfg. Co., Canton, O.

Canton Art Metal Co., Canton  
 Gen. Fireproofing Co., Youngstown, O.  
 Van Dorn Iron Works Co., Cleveland, O.

## FILTERS, OIL

S. F. Bowser & Co., Inc., Ft. Wayne, Ind.

## FILTERS, WATER

Amer. Water Softener Co., Philadelphia, Pa.  
 Cochran Corp., Philadelphia  
 Graver Corporation, E. Chicago, Ind.  
 International Filter Co., Chicago  
 Norwood Engineering Co., Florence, Mass.  
 Roberts Filter Co., Darby, Pa.  
 W. B. Scaife & Sons, Pittsburgh, Pa.

## FINISHING MACHINES, CONCRETE ROAD (See Concrete Road Finishers)

## FIRE & POLICE ALARM SYSTEMS

Gamewell Co., Newton Upper Falls, Mass.  
 Harrington-Seaberg Corp., Moline, Ill.  
 Sterling Siren Fire Alarm Co., Rochester, N. Y.

## FIRE ALARM SIRENS

\*Union Water Meter Co., Worcester, Mass.  
 Erick Electric Siren Co., St. Paul, Minn.  
 Federal Sign System, Chicago  
 Hendrie & Bolhoff Mfg. & Sps. Co., Deaver, Colo.  
 Holizer-Cabot Electric Co., Boston  
 Sterling Siren Fire Alarm Co., Rochester, N. Y.

## FIRE APPARATUS, MOTOR

\*Mack Trucks, Inc., New York  
 Ahrens-Fox Fire Eng. Co., Cincinnati, O.  
 Amer-La France & Foamite Corp., New York  
 Boyer Fire Apparatus Co., Loganport, Ind.  
 Brockway Motor Fire Apparatus Co., Cortlandt, N. Y.  
 Buffalo Fire Appl. Corp., Buffalo, N. Y.  
 Hale Fire Pump Co., Conshohocken, Pa.  
 Jaeger Portable Power Corp., Detroit  
 Northern Fire Apparatus Co., Minneapolis, Minn.  
 Peter Pirsch & Sons Co., Kenosha, Wis.  
 Prospect Fire Engine Co., Prospect, O.  
 Seagrave Co., Columbus, O.  
 Stuts Fire Eng. Co., Indianapolis, Ind.  
 Waterous Fire Eng. Wks., St. Paul, Minn.  
 White Co., Cleveland

## FIRE EXTINGUISHERS, CHEMICAL

Amer-La France & Foamite Corp., New York  
 Buffalo Fire App. Corp., Buffalo, N. Y.  
 Pyrene Mfg. Co., Newark, N. J.

## FIRE HOSE (See Hose, Fire)

## FIRST AID EQUIPMENT

Amer-La France & Foamite Corp., New York

## FITTINGS, ACID RESISTING

Barber Asphalt Co., Philadelphia

## FLEXIBLE JOINTS

\*Central Foundry Co., New York  
 \*U. S. C. I. Pipe & Fdry. Co., Burlington, N. J.  
 Coldwell-Wilcox Co., Newburgh, N. Y.  
 Crane Co., Chicago  
 United Lead Company, New York

## FLOOD LIGHTING PROJECTORS

General Electric Co., Schenectady

## FLOORING, COMPOSITION

\*Barrett Co., New York  
 Am. Mason Safety Tr. Co., Lowell, Mass.  
 Barber Asphalt Co., Philadelphia  
 Johns-Manville, Inc., New York  
 Marine Decking & Sup. Co., Philadelphia, Pa.  
 Franklin R. Muller & Co., Waukegan, Ill.

## FLOORS, WOOD BLOCK

\*Barrett Co., New York  
 Carter Blomsted Flooring Co., Kansas City, Mo.  
 Jennison-Wright Co., Toledo, O.  
 Midland Creos. Co., Toledo, O.  
 Republic Creos. Co., Indianapolis, Ind.  
 Sou. Wood Preserving Co., Atlanta, Ga.  
 Wyckoff Pipe & Creos. Co., New York

## FLUSH TANKS

Pacific Flush Tank Co., Chicago and N. Y.

## FLUSHERS, STREET (See Street Flushers and Sprinklers)

## FORGES

Buffalo Forge Co., Buffalo, N. Y.  
 Hauck Mfg. Co., Brooklyn, N. Y.

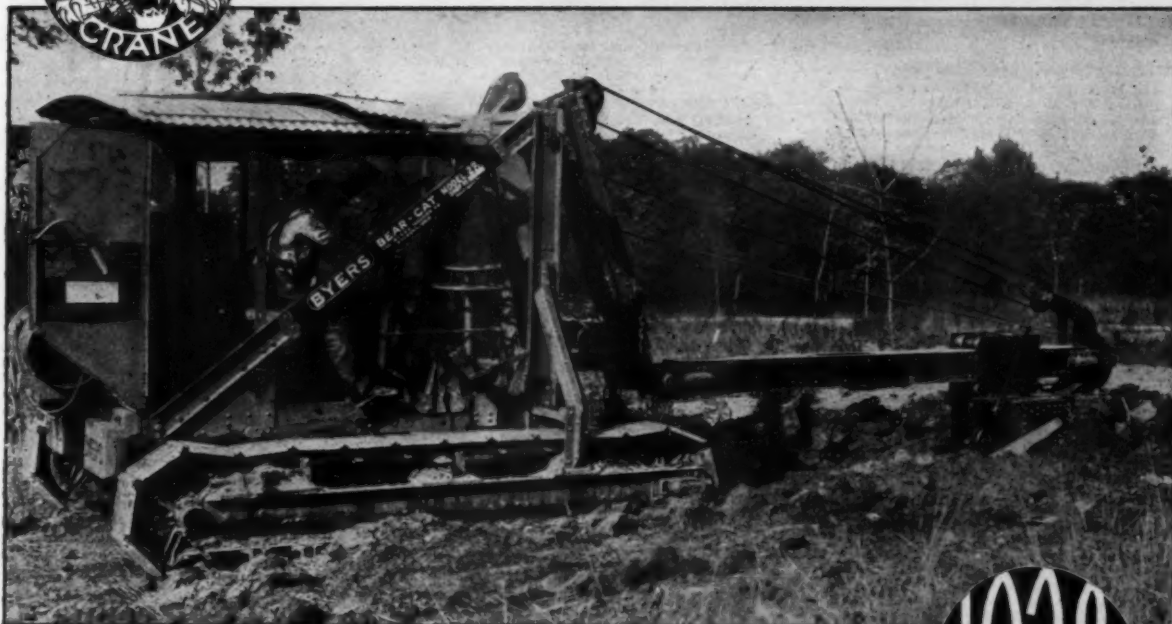
## FORGES, OIL (Rivet Heating)

Hauck Mfg. Co., Brooklyn, N. Y.  
 Mead-Morrison Mfg. Co., E. Boston

## FORM CLAMPS

\*Insley Mfg. Co., Indianapolis, Ind.  
 \*M. & M. Wire Clamp Co., Minneapolis  
 Hawley Mfg. Co., Chicago  
 Fischer & Hayes Rope & Steel Co., Chicago  
 W. A. Kuhlman & Co., Toledo, O.

# HAVE *You* SEEN THE NEW BEAR CAT IMPROVEMENTS?



1928

**D**O you think of the Bear Cat as being the same machine as the models of a few years back? Many of these are still giving good service all over the country, and there is no question but that the old Bear Cat was a good little machine—none better at the time—but the Bear Cat of today is far ahead of those earlier models.

The new Bear Cat is bigger, more rugged, better built, more efficiently designed. It has more power, larger crawlers, better steering, and has high grade alloy steel parts throughout.

It is a "Bear Cat" for work, a valuable all around tool for every contractor, at a price that is remarkably low for such a high grade, big performing piece of equipment.

*Send for full information on Ditcher,  
Skimmer or Crane, or any combination.*

**THE BYERS MACHINE COMPANY, Ravenna, Ohio**  
*Sales and Service throughout the Country*

Builders of the "Master" Shovels, 1 and 1½ yds.; The Bear Cat, ½ yard; the Bear Cat "Whirly", ¾ yard; and the Byers-Massillon Steam Shovels.

## **BYERS BEAR CAT**

# Where to Purchase

Universal Form Clamp Co., Chicago

## FORMS, CONCRETE

\*Blaw-Knox Co., Pittsburgh, Pa.  
\*Holtzel Stl. Form & Ir. Co., Warren, O.  
\*Lakewood Eng. Co., Cleveland, O.  
\*Truscon Steel Co., Youngstown, O.  
\*Concrete Form Co., Inc., Syracuse, N. Y.  
\*Holtzel Stl. Products Co., Binghamton, N. Y.  
\*Metal Forms Corp., Milwaukee

## FORMS, MANHOLE, PIPE, SEWER, ETC.

\*Blaw-Knox Co., Pittsburgh, Penna.  
\*Holtzel Stl. Form & Ir. Co., Warren, O.

## FORMGRADERS

\*Ted Carr & Co., Chicago

## FOUNTAINS, DRINKING

Casey-Hedges Co., Chattanooga, Tenn.  
Jas. B. Clow & Sons, Chicago  
Crane Co., Chicago  
Murdock Mfg. & Sup. Co., Cincinnati  
Faro San. Dr. Fm. Co., Haydenville, Mass.  
Rundie-Spence Mfg. Co., Milwaukee  
Stewart Iron Works Co., Cincinnati, O.  
Halsey W. Taylor Co., Warren, O.  
Century Brass Works, Belleville, Ill.

## FULL CRAWLERS

\*Truscon Co., Milwaukee

## FURNITURE AND FILES, STEEL

Art Metal Const. Co., Jamestown, N. Y.  
Canton Art Metal Co., Canton  
General Fireproofing Co., Youngstown, O.  
Van Dorn Iron Works Co., Cleveland, O.

## FURRING AND SLEEPER ANCHORS

Dayton Sore Grip & Shore Co., Dayton, O.

## GAGES, SURFACE, RESERVOIR AND SPECIAL WATERWORKS

Builders Iron Fdry., Providence, R. I.  
Simplex Valve & Meter Co., Philadelphia, Pa.

## GAGES, WATER

Bristol Co., Waterbury, Conn.  
Lankenshimer Co., Cincinnati, O.  
Walworth Mfg. Co., Boston

## GARBAGE CANS (See Cans)

## GARBAGE DISPOSAL SYSTEMS

American Beccari Corp., New York  
C. O. Bartlett & Snow Co., Cleveland, O.  
Decarie Incinerator Co., L. I. C., N. Y.  
Goder Incinerator Corp., Chicago  
Hiller Eng. & Const. Co., Brooklyn, N. Y.  
Midwest Incinerator Co., Chicago  
Morris-Boulger Destructor Co., New York  
Nye Odorless Crematory Co., Macon, Ga.  
Pittsburgh-Des Moines Steel Co., Pittsburgh, Pa.

## GARBAGE TRAILERS AND BODIES

\*Heli Co., Milwaukee  
\*Highway Trailer Co., Edgerton, Wis.  
\*Dodge Corp., New York  
Detroit Trailer & Mach. Co., Detroit  
Lee Trailer & Body Co., Plymouth, Ind.  
Littleford Bros., Cincinnati  
Troy Trailer & Wagon Co., Troy, O.

## GARBAGE TRUCKS

\*Heli Co., Milwaukee, Wis.  
Geo. H. Holtsberg & Bro., Jeffersonville, Ind.  
Lee Trailer & Body Co., Plymouth, Ind.  
Rex-Watson Corp., Canastota, N. Y.

## GAS METERS (See Meters, Gas)

## GAS PRODUCERS

Westinghouse Electric & Mfg. Co., E. Pittsburgh, Pa.  
R. D. Wood & Co., Philadelphia, Pa.

## GASOLINE STORAGE TANKS

\*Heli Co., Milwaukee, Wis.  
Biggs Boiler Works, Akron, O.  
Birmingham Tank Co., Birmingham, Ala.  
R. F. Bower & Co., Inc., Ft. Wayne, Ind.  
Chicago Bridge & Iron Works, Chicago  
Graver Corp., East Chicago, Ind.  
Lancaster Iron Works, Inc., Lancaster, Pa.  
Littleford Bros., Cincinnati, O.  
Wm. B. Seafie & Sons, Pittsburgh, Pa.  
Tehkem Oil Tank & Pump Co., Ft. Wayne, Ind.  
United Iron Works, Inc., Kansas City, Mo.  
Wayne Co., Fort Wayne, Ind.

## GATES, SLUICE

Chapman Valve Mfg. Co., Indian Orchard, Mass.  
Cotton Valve Co., Boston, Mass.  
Coddell-Wilcox Co., Newburgh, N. Y.  
R. Hardisty Mfg. Co., Denver  
Ladlow Valve Mfg. Co., Troy, N. Y.

## GATES FOR PARKS AND CEMETERIES

Stewart Iron Works Co., Cincinnati, O.  
Wayne Iron Works, Wayne, Pa.

## GENERATOR SETS

Carbie Mfg. Co., Duluth  
Climax Engineering Co., Clinton, Ia.  
Cook Motor Co., Delaware, O.

## GLASS, FIREPROOF (See Wire Glass)

## GOVERNORS, GASOLINE ENGINE

Gardner-Denver Co., Quincy, Ill.  
Pickering Governor Co., Portland, Ct.

## GRADERS, ROAD (See Road Graders)

## GRADER, BLADES

\*Gallon Ir. Wks. & Mfg. Co., Gallon, O.  
\*Russell Grader Mfg. Co., Minneapolis  
J. D. Adams & Co., Indianapolis, Ind.  
Shunk Mfg. Co., Bucyrus, O.

## GRAND STANDS, PORTABLE

Circle A. Prod. Corp., Newcastle, Ind.  
Leavitt Mfg. Co., Urbana, Ill.  
Wayne Iron Works, Wayne, Pa.

## GRATING, STEEL

\*Blaw-Knox Co., Pittsburgh

## GREASE

\*D-A Lubricant Co., Inc., Indianapolis  
\*Joa. Dixon Crucible Co., Jersey City, N. J.  
Dixoyl, Inc., St. Louis

## GRINDERS, PNEUMATIC

\*Tousley Tool Co., Cleveland, Ohio  
Chicago Pneumatic Tool Co., New York  
Cleveland Pneumatic Tool Co., Cleveland, O.  
Ingersoll-Rand Co., New York

## GRIZZLIES

Allis-Chalmers Mfg. Co., Milwaukee  
Austin Mfg. Co., Chicago  
Robins Conv. Belt Co., New York  
Smith Engineering Works, Milwaukee  
Stephens-Adams Mfg. Co., Angora, Ill.

## GUARDS, ROAD & HIGHWAY

\*Am. Steel & Wire Co., Chicago  
\*Williamsport Wire Rope Co., Williamsport, Pa.  
Cyclone Fence Co., Waukegan, Ill.  
Hazard Insulated Wire Wks., Wilkesbarre, Pa.  
Stewart Iron Works Co., Cincinnati  
Wickwire-Spencer Steel Co., New York

## GYPSUM PRODUCTS

U. S. Gypsum Co., Chicago  
Fenton Mfg. Co., Cleveland, O.

## HAMMERS, STEAM, PILE (See Pile Hammers, Steam)

## HEAT INSULATING MATERIAL

\*Phillip Carey Co., Cincinnati, O.  
Johns-Manville, Inc., New York

## HEATING KETTLES (See Kettles)

## HIGHWAY MOWERS

Rawls Mfg. Co., Chicago

## HITCHES

\*Gustav Schaefer Wagon Co., Cleveland, O.  
\*Whitehead & Kales Co., Detroit  
Detroit Trailer & Machine Co., Detroit  
Fenton Mfg. Co., Cleveland, O.  
Trail-IT Co., St. Paul, Minn.

## HOISTS, AUTOMATIC

Zetterlund Hst. & Mch. Co., Milwaukee

## HOISTS, BELT-DRIVEN

\*Amer. Saw Mill Mch. Co., Hackettstown, N. J.  
\*Debbie Fdry. & Mach. Co., Niagara Falls  
\*Domestic Engine & Pump Co., Shippensburg, Pa.

\*Lidgerwood Mfg. Co., Elizabeth, N. J.

\*Mundy Sales Corp., New York  
American Hoist & Derrick Co., St. Paul, Minn.  
Mead-Morrison Mfg. Co., Boston, Mass.  
Street Bros. Mach. Wks., Chattanooga  
Universal Hoist & Mfg. Co., Cedar Falls, Ia.  
Weller Mfg. Co., Chicago  
Williams Hoist Co., Los Angeles, Calif.

## HOISTS, CONCRETE, TOWER

\*Domestic Engine & Pump Co., Shippensburg, Pa.  
\*Insley Mfg. Co., Indianapolis, Ind.  
\*Lakewood Eng. Co., Cleveland, O.  
\*Lidgerwood Mfg. Co., Elizabeth, N. J.  
\*Mundy Sales Corp., New York  
\*Novo Engine Co., Lansing, Mich.

\*Ransome Conc. Mch. Co., Dunellen, N. J.

English Bros. Mach. Co., Kansas City  
Mead-Morrison Mfg. Co., Boston  
Street Bros. Mach. Wks., Chattanooga

## HOISTS, ELECTRIC

\*Clyde Iron Wks. Sales Co., Duluth, Minn.  
\*Construction Machy. Co., Waterloo, Ia.  
\*Dake Eng. Co., Grand Haven, Mich.  
\*Debbie Fdry. & Mach. Co., Niagara Falls  
\*Domestic Eng. & Pump Co., Shippensburg, Pa.  
\*S. Flory Mfg. Co., Bangor, Pa.  
\*Lidgerwood Mfg. Co., Elizabeth, N. J.  
\*Mundy Sales Corp., New York  
\*Novo Engine Co., Lansing, Mich.  
\*O. K. Clutch & Mach. Co., Columbia, Pa.  
\*Sullivan Machy. Co., Chicago  
Am. Hoist & Derrick Co., St. Paul, Minn.  
Chisholm-Moore Co., Cleveland, O.  
Norris K. Davis, San Francisco, Calif.  
English Bros. Machy. Co., Kansas City  
Ersted Mfg. Co., Portland, Ore.  
Harnischfeger Corp., Milwaukee  
Mead-Morrison Mfg. Co., Boston  
Ntl. Hoisting Eng. Co., Harrison, N. J.  
Northern Engineering Works, Detroit  
Street Bros. Mach. Wks., Chattanooga  
Thomas Elevator Co., Chicago  
Treadwell Engineering Co., Easton, Pa.  
Universal Hoist & Mfg. Co., Cedar Falls, Ia.  
Vulcan Iron Works, Wilkes-Barre, Pa.  
Williams Hoist Co., Los Angeles, Calif.

## HOISTS, FORDSON

\*Clyde Ir. Wks. Sales Co., Duluth, Minn.  
Ersted Mfg. Co., Portland, Ore.  
Okla. Eng. & Fdry. Co., Muskogee, Okla.  
Otis Engineering Corp., New York  
Pioneer Tractors, Inc., Winona, Minn.  
Sheffield Tool & Supply Co., Sheffield, Pa.  
Willamette Iron & Steel Wks., Portland, Ore.

## HOISTS, GASOLINE

\*Amer. Saw Mill Mch. Co., Hackettstown, N. J.

\*Clyde Iron Wks. Sales Co., Duluth, Minn.  
\*Construction Machy. Co., Waterloo, Ia.  
\*Dake Eng. Co., Grand Haven, Mich.  
\*Domestic Eng. & Pump Co., Shippensburg, Pa.  
\*S. Flory Mfg. Co., Bangor, Pa.  
\*Lansing Co., Lansing, Mich.  
\*Lidgerwood Mfg. Co., Elizabeth, N. J.  
\*Mundy Sales Corp., New York  
\*Novo Engine Co., Lansing, Mich.  
\*O. K. Clutch & Mach. Co., Columbia, Pa.  
Amer. Cement Mach. Co., Inc., Keokuk, Ia.  
Amer. Hoist & Der. Co., St. Paul, Minn.  
Amer. Mfg. & Eng. Co., Kalamazoo, Mich.  
Austin Mfg. Co., Chicago  
Buffalo Hoist & Derrick Co., Buffalo, N. Y.  
C. H. & E. Mfg. Co., Milwaukee  
Dyrr Mfg. Co., Huntington Park, Calif.  
Norris K. Davis, San Francisco, Calif.  
English Bros. Machy. Co., Kansas City  
Ersted Mfg. Co., Portland, Ore.  
Mead-Morrison Mfg. Co., Boston  
Ntl. Hoisting Eng. Co., Harrison, N. J.  
Orr & Sombower, Reading, Pa.  
Pioneer Tractors, Inc., Winona, Minn.  
Street Bros. Mach. Wks., Chattanooga  
Thomas Elevator Co., Chicago  
Universal Hoist & Mfg. Co., Cedar Falls, Ia.  
Williams Hoist Co., Los Angeles, Calif.

## HOISTS, HAND

\*Beebe Bros., Inc., Seattle, Wash.  
\*Debbie Fdry. & Machine Co., Buffalo, N. Y.  
Dyrr Mfg. Co., Los Angeles, Calif.

## HOISTS, PNEUMATIC

\*Curtis Pneumatic Mch. Co., St. Louis  
\*Dake Eng. Co., Grand Haven, Mich.  
\*Independent Pneu. Tool Co., Chicago, Ill.  
\*Sullivan Machinery Co., Chicago  
Chicago Pneumatic Tool Co., New York  
Detroit Hoist & Mach. Co., Detroit  
Gardner-Denver Co., Quincy, Ill.  
Gilman Mfg. Co., E. Boston, Mass.  
Hanna Engineering Works, Chicago  
Ingersoll-Rand Co., New York  
Mead-Morrison Mfg. Co., Boston  
Northern Eng. Works, Detroit, Mich.  
Werthington Pump & Mch. Corp., N. Y.

## HOISTS, STEAM

\*Clyde Iron Wks. Sales Co., Duluth, Minn.  
\*Dake Engine Co., Grand Haven, Mich.  
\*S. Flory Mfg. Co., Bangor, Pa.  
\*Lidgerwood Mfg. Co., Elizabeth, N. J.  
\*Mundy Sales Corp., New York  
\*Sullivan Machinery Co., Chicago  
Amer. Hoist & Derrick Co., St. Paul, Minn.  
Hardie-Tynes Mfg. Co., Birmingham, Ala.  
Ingersoll-Rand Co., New York  
Mead-Morrison Mfg. Co., Boston  
Ntl. Hoisting Eng. Co., Harrison, N. J.  
Orr & Sombower, Reading, Pa.  
Street Bros. Mach. Works, Chattanooga  
Thomas Elevator Co., Chicago  
Treadwell Engineering Co., Easton, Pa.

## HOISTS FOR MOTOR TRUCKS

\*Beebe Bros., Inc., Seattle, Wash.  
\*Ersted Mfg. Co., Portland, Ore.  
\*Heli Co., Milwaukee  
\*Lidgerwood Mfg. Co., Elizabeth, N. J.

If you find any errors or omissions in this Where to Purchase list, please send corrections to CONTRACTORS AND ENGINEERS MONTHLY



# Jaeger's "Jiffy" Placing Plant Conveys and Places Concrete ~ at a 50% Saving in Wages of Wheelers

An Inexpensive Plant that can be Set Up or Knocked Down in a Jiffy—Adjustable up to 100 Feet in Length—also Flexible in Height



On its proper job, which is distributing mass concrete over large areas, bridges, viaducts or up to 3-story buildings, this Placing Plant will double your mixer output by allowing batches to be dumped in skip car as soon as mixed *without waiting for wheelers*, and conveyed direct to hopper for short spouting or wheeling to forms.

As a conveyor, using up to 13 sections, you can move material over 100 feet exclusive of spouting. Costs  $\frac{1}{3}$  the price of an ordinary belt conveyor. Also has big advantage over ordinary towers be-

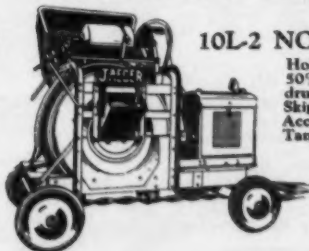
cause mixer and materials can be put in street or on hard ground and mixed concrete conveyed to center of the job.

**Quicker, Easier to Erect and Move**  
Sections are 10 ft. each, with self-locking joints. Supports are adjustable for height. Everything nests up nicely for transport. Two men can handle any part. Built in two sizes. Outfit A fits 5S to 10S mixers: Outfit B is for use with  $\frac{1}{2}$  yard mixers. Outfit can be furnished for spouting, floor hopper or material cage and platform work.



**7H-4 Hoist-Tilting Mixer Combined**

One man control saves one engine and one operator; gives you Jaeger mixing efficiency and speed with heavy duty hoist, foot brake and safety ratchet.



**10L-2 NON-TILTING MIXER**

Holds 2 Bags, 1-2-5 mix. All steel, 50% stronger,  $\frac{1}{2}$  ton lighter. Big drum openings and Automatic Skip Shaker increase speed. Accurate Measure Water Tank.

# JAEGER

**Tear off and Mail Coupon Today**

**THE JAEGER MACHINE CO.**  
761 Dublin Avenue, Columbus, Ohio  
Please send catalog, prices and terms on Placing Plant and Combined  
☐ Tilting Mixers and Hoist ☐ Non-Tilt Mixers

Name \_\_\_\_\_ Address \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_

GET BIG CATALOG, JAEGER MIXERS 3 $\frac{1}{2}$  to 28 Ft. Sizes

Please mention the CONTRACTORS AND ENGINEERS MONTHLY—it helps.

# Where to Purchase

\*Wood Hydr. Hoist & Body Co., Detroit  
Atia Corporation, New York  
Hydr. Hoist Mfg. Co., St. Paul, Minn.  
Joliet Mfg. Co., Joliet, Ill.  
Rock Mfg. Co., Waterloo, N. Y.  
Van Dorn Iron Works Co., Cleveland, Ohio

## HOISTS, PORTABLE

\*Eebe Bros., Inc., Seattle, Wash.  
Erat Mfg. Co., Portland, Ore.  
Joliet Mfg. Co., Joliet, Ill.  
Pioneers Tractors, Inc., Winona, Minn.  
Jas. B. Seaverns Co., Batavia, Ill.

## HOPPERS, CONCRETE (Aggregate Measuring)

\*Blaw-Knox Company, Pittsburgh, Pa.  
\*Hetsel St. Form & Ir. Co., Warren, O.  
\*C. S. Johnson Co., Champaign, Ill.  
\*Lakewood Eng. Co., Cleveland, O.  
\*Ransome Const. Mch. Co., Danvers, N. J.  
Butler Bin Co., Waukesha, Wis.  
Jas. B. Seaverns Co., Batavia, Ill.

## HOSE, AIR

\*The Buhl Company, Chicago  
\*Independent Pneu. Tool Co., Chicago  
Chicago Pneumatic Tool Co., New York  
Cincinnati Rubber Mfg. Co., Cincinnati  
Cleveland Rock Drill Co., Cleveland, O.  
The Dallett Co., Philadelphia, Pa.  
Gilman Mfg. Co., East Boston, Mass.  
Goodyear Tire & Rubber Co., Akron, O.  
Hardscap Wonder Dr. Co., Ottumwa, Ia.  
Ingersoll-Rand Co., New York  
Malconroy Co., Inc., Philadelphia, Pa.  
Penna. Flexible Metallic Tubing Co., Phila., Pa.  
Republic Rubber Co., Youngstown, O.  
United States Rubber Co., New York

## HOSE, FIRE

Bi-Lateral Fire Hose Co., Chicago  
Bureks Fire Hose Mfg. Co., New York  
Fabric Fire Hose Co., New York  
B. F. Goodrich Rubber Co., Akron, O.  
Goodyear Tire & Rubber Co., Akron, O.

## HOUSE-MOVING EQUIPMENT

LaPlant-Chaste Mfg. Co., Cedar Rapids, Iowa

## HOUSE NUMBERS

Hamilton Metal Prod. Co., Hamilton, O.  
C. H. Hanson Co., Chicago  
Niagara Metal Stamping Corp., Niagara Falls, N. Y.

## HOUSES, PORTABLE (See Portable Buildings)

## HYDRANTS, FIRE

Chapman Valve Mfg. Co., Indian Orchard, Mass.  
Columbian Ir. Wks., Chattanooga, Tenn.  
Darling Valve & Mfg. Co., Williamsport, Pa.  
Eddy Valve & Mfg. Co., Watford, N. Y.  
Iowa Valve Co., Oskaloosa, Ia.  
Kennedy Valve Mfg. Co., Elmira, N. Y.  
Ludlow Valve Mfg. Co., Troy, N. Y.  
Norwood Eng. Co., Florence, Mass.  
Rensselaer Valve Co., Troy, N. Y.  
A. P. Smith Mfg. Co., E. Orange, N. J.  
Waterous Co., St. Paul  
R. D. Wood & Co., Philadelphia, Pa.

## HYDRAULIC RAMS

Deming Co., Salem, O.  
Johnson Mfg. Co., Seattle, Wash.  
Rife Hydraulic Engine Co., New York  
Rumsey Pump Co., Seneca Falls, N. Y.

## ICE-MAKING MACHINERY

Arctic Ice Machine Co., Canton, O.  
Baker Ice Machine Co., Omaha, Neb.  
Brunswick-Kronschell Co., N. Brunswick, N. J.  
Carbondale Mach. Co., Carbondale, Pa.  
De La Vergne Mach. Co., New York  
Frick Co., Inc., Waynesboro, Pa.  
Ingersoll-Rand Co., New York  
Triumph Ice Mach. Co., Cincinnati, O.  
United Iron Works, Inc., Kansas City, Mo.  
Vilter Mfg. Co., Milwaukee, Wis.  
Henry Vogt Mach. Co., Louisville, Ky.  
York Mfg. Co., York, Pa.

## IGNITION SYSTEMS

\*Hessmann Magneto Corp., New York  
American Bosch Magneto Corp., Springfield, Mass.  
Dayton Eng. Lab. Co., Dayton, O.  
Splittorf Electric Co., Newark, N. J.

## INCINERATORS, GARBAGE (See Garbage Disposal)

## INDICATOR POSTS (See Valves)

## INSPECTING LABORATORIES

\*Conard & Busby, Burlington, N. J.  
\*Robert W. Hunt Co., Chicago, Ill.  
\*Fading Testing Laboratories, Des Moines, Ia.  
Allentown Testing Laboratory, Allentown, Pa.  
E. L. Conwell & Co., Philadelphia, Pa.  
Galick-Headerson Co., New York  
New York Testing Lab., New York  
Pittsburgh Testing Lab., Pittsburgh

## INSTRUMENTS AND SUPPLIES (Surveyors' and Engineers')

Wm. Alanworth & Sons, Denver, Col.  
L. Beckman Co., Toledo, O.

C. L. Berger & Sons, Boston  
Brandis & Sons Mfg. Co., Brooklyn, N. Y.  
Buff & Buff Mfg. Co., Boston  
Eugene Dietgen Co., Chicago  
W. & L. E. Gurley, Troy, N. Y.  
Kouffel & Esser Co., Hoboken, N. J.  
Kolesch & Co., New York  
A. Lietz Co., San Francisco  
Leupold-Velpel & Co., Portland, Ore.  
Warren Knight Co., Philadelphia, Pa.  
F. Weber & Co., Philadelphia, Pa.  
David White Co., Milwaukee, Wis.

## INTEGRAL CURB AND BASE FORMS (See Forms, Concrete)

## IRON WORK, STRUCTURAL AND ORNAMENTAL (See Bridges and Buildings)

## JACKS, LIFTING

\*McKiernan-Terry Drill Co., New York  
\*Templeton, Kenly & Co., Ltd., Chicago  
Duff Mfg. Co., Pittsburgh, Pa.  
Joyce-Cridland Co., Dayton, O.  
A. O. Norton, Inc., Moline, Ill.  
Oil Jack Co., New York  
Reese Mfg. Co., Pittsburgh, Pa.  
Watson-Stillman Company, New York

## JACKS, PIPE FORGING

Duff Mfg. Co., Pittsburgh, Pa.  
Easy Mfg. Co., Lincoln, Neb.

## JAIL AND PRISON WORK

Fries & Son Steel Const. & Eng. Co., Covington, Ky.  
Manly Jail Works, Dalton, Ga.  
Pauly Jail Building Co., St. Louis, Mo.  
Southern Prison Co., San Antonio, Tex.  
Stewart Iron Works Co., Cincinnati, O.  
Van Dorn Iron Works Co., Cleveland

## JOINTS, EXPANSION PAVING (See Expansion Joint Material)

## JOINTS, FLEXIBLE PIPE (See Flexible Joints)

## JOISTS, STEEL

\*Truscon Steel Co., Youngstown, O.  
Berger Mfg. Co., Canton, O.  
Genfire Steel Co., Youngstown, O.  
Ingalls Steel Prod. Co., Birmingham, Ala.

## KETTLES, FOR ASPHALT AND TAE

\*Acme Rd. Mach. Co., Frankfort, N. Y.  
\*Aeroll Burner Co., West New York, N. J.  
\*Connery & Co., Inc., Philadelphia, Pa.  
\*Good Roads Mch. Co., Kennett Square, Pa.  
\*Jos. Honherst Co., Cincinnati, O.  
\*Kinney Mfg. Co., Boston, Mass.  
\*Union Iron Works, Inc., Hoboken, N. J.  
Barber Asphalt Co., Philadelphia, Pa.  
Case & Lyman, Boston, Mass.  
Chambers Oil Burner Co., Elkhart, Ind.  
Hauck Mfg. Co., Brooklyn, N. Y.  
Lancaster Iron Works, Inc., Lancaster, Pa.  
Littleford Bros., Cincinnati, O.  
MacLeod Co., Cincinnati, O.  
Spears-Wells Mch. Co., Oakland, Cal.  
G. L. Staebner Ir. Wks., Inc., Long Island City, N. Y.  
Tarrant Mfg. Co., Saratoga Springs, N. Y.  
Universal Rd. Mach. Co., Kingston, N. Y.

## LANTERNS, CONTRACTORS'

\*R. E. Dietz Co., New York  
\*Alex. Millburn Co., Baltimore, Md.  
\*National Carbide Sales Corp., New York  
Defiance Lantern & Stamping Co., Rochester, N. Y.  
Economy Electric Lantern Co., Chicago  
Handlan, Buck Mfg. Co., St. Louis  
Star Headlight & Lantern Co., Rochester, N.Y.

## LATH, METAL

\*Truscon Steel Co., Youngstown, O.  
Berger Mfg. Co., Canton, O.  
Bostwick Steel Lath Co., Niles, O.  
Consolidated Expanded Metals Co., Wheeling, W. Va.  
Genfire Steel Co., Youngstown, O.  
Milwaukee Corr. Co., Milwaukee, Wis.  
Northwestern Exp. Metal Co., Chicago  
Penn. Metal Co., Boston, Mass.  
Sykes Metal Lath and Roofing Co., Niles, O.  
Youngstown Pressed Steel Co., Warren, O.

## LAWN MOWERS

Chadborn & Coldwell Mfg. Co., New  
Coldwell Lawn Mower Co., Newburgh, N. Y.  
Gilson Mfg. Co., Fort Washington, Wis.  
Ideal Power Lawn Mower Co., Lansing, Mich.  
Jacobson Mfg. Co., Racine, Wis.  
Kinney Standards, Inc., Brooklyn, N. Y.  
Modern Mach. Works, Milwaukee  
Penna. Lawn Mower Works, Philadelphia, Pa.  
Phila. Lawn Mower Co., Philadelphia, Pa.  
S. P. Townsend Co., Bloomfield, N. J.  
Worthington Mower Co., Stroudsburg, Pa.

## LAWN MOWER SHARPENERS

\*Fete-Root-Heath Co., Plymouth

## LEADITE

The Leadite Co., Philadelphia, Pa.

## LEAD-MELTING FURNACES

\*Aeroll Burner Co., West New York, N. J.  
Chicago Flexible Shaft Co., Chicago  
Hauck Mfg. Co., Brooklyn, N. Y.  
Littleford Bros., Cincinnati, O.  
A. P. Smith Mfg. Co., East Orange, N. J.

## LETTERING GUIDES

Wood-Regan Inst. Co., So. Orange, N. J.

## LETTERS AND FIGURES, METAL

Niagara Metal Stamp. Corp., Niagara Falls, N. Y.

## LIGHTS, CONTRACTORS'

\*Alex. Millburn Co., Baltimore, Md.  
\*National Carbide Sales Corp., New York  
General Electric Co., Schenectady, N. Y.  
Carbie Mfg. Co., Duluth, Minn.  
Hauck Mfg. Co., Brooklyn, N. Y.  
MacLeod Co., Cincinnati, O.  
Prest-O-Lite Co., Inc., New York

## LIGHTING STANDARDS (See Street Lamp Posts)

## LIQUID CHLORINE

Arnold, Hoffman & Co., Inc., New York  
Electro Bleaching Gas Co., New York  
Hooker Electrochemical Co., New York  
Mathieson Alkali Works, Inc., New York  
Penna. Salt Mfg. Co., Philadelphia, Pa.

## LOADERS, GRAVEL, WAGON, CAR, ETC.

\*Barber-Greene Co., Aurora, Ill.  
\*Bay City Dredge Wks., Bay City, Mich.  
\*Bucyrus-Erie Co., Erie, Pa.  
\*Burch Corp., The, Crestline, O.  
\*Chicago Automatic Conv. Co., Chicago  
\*Fairfield Engineering Co., Marion, Ohio  
\*Hetsel Stl. Form & Ir. Co., Warren, O.  
\*Link-Belt Co., Chicago  
\*Russell Grader Mfg. Co., Minneapolis  
\*Sauerman Bros., Chicago  
\*Star Drilling Mach. Co., Akron, O.  
\*Trackson Co., Milwaukee, Wis.  
Bonney Supply Co., Inc., Rochester, N. Y.  
Conant Mach. Co., Concord Junc., Mass.  
F-S Mfg. Co., New Holstein, Wis.  
Gallon Iron Wrks. & Mfg. Co., Gallon, O.  
Gifford-Wood Co., Hudson, N. Y.  
Geo. Haiss Mfg. Co., N. Y.  
Hughes-Keenan Co., Mansfield, O.  
Industrial Brownhoist Corp., Cleveland  
Jeffrey Mfg. Co., Columbus, O.  
Kent Machine Co., Kent, O.  
Lee Trailer & Body Co., Plymouth, Ind.  
Logan Co., Louisville, Ky.  
Nelson Iron Wks., Passaic, N. J.  
New Holland Mch. Co., N. Holland, Pa.  
Northern Conveyor Co., Janesville, Wis.  
Portable Machinery Co., Clifton, N. J.  
H. B. Sackett Screen & Chute Co., Chicago  
Spears-Wells Mch. Co., Oakland, Cal.  
Specialty Engineering Co., Philadelphia, Pa.  
Universal Rd. Mach. Co., Kingston, N. Y.  
Weller Mfg. Co., Chicago

## LOCKERS, STEEL

Durand Steel Locker Co., Chicago  
Hart & Hutchinson Co., N. Britain, Ct.  
Lyon Metallic Mfg. Co., Aurora, Ill.  
Fred. Medart Mfg. Co., St. Louis, Mo.

## LOCOMOTIVES, FOR CONTRACTORS, ETC.

\*Brookville Locomotive Co., Brookville, Pa.  
\*Fete-Root-Heath Co., Plymouth, O.  
\*Geo. D. Whitcomb Co., Rochelle, Ill.  
Baldwin Loc. Works, Philadelphia, Pa.  
Davenport Loc. Works, Davenport, Ia.  
Heisler Locomotive Works, Erie, Pa.  
Lima Loc. Works, Lima, O.  
Mid-West Locomotive Works, Cincinnati  
Milwaukee Loc. Mfg. Co., Milwaukee  
H. K. Porter Co., Pittsburgh, Pa.  
Vulcan Iron Works, Wilkes-Barre, Pa.  
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

## LUBRICANTS

\*D-A Lubricant Co., Indianapolis, Ind.  
Dixoy, Inc., St. Louis.  
Texas Co., New York

## LUBRICATORS

The Bascak Mfg. Co., Chicago  
Carr Fastener Co., Cambridge, Mass.

## MANGANESE STEEL PRODUCTS

American Manganese St. Co., Chicago H'ts., Ill.  
Taylor-Wharton Ir. & St. Co., High Bridge, N. J.

## MANHOLE COVERS (See Castings)

## METAL LATH (See Lath)

## METAL ROOFING (See Roofing)

## METER BOXES

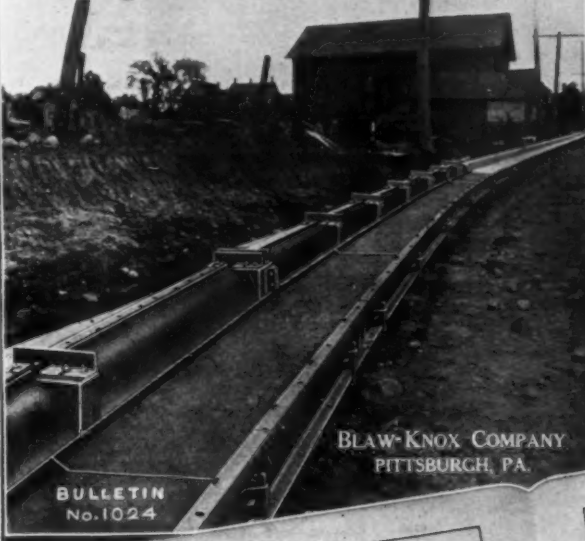
Builders Iron Foundry, Providence, R. I.  
H. W. Clark Co., Matteson, Ill.

\* Indicates that the manufacturer carries an advertisement. See index facing inside back cover.\*

## BLAW-KNOX STEEL STREET FORMS

(Universal Forms)

for Curb, Curb and Gutter,  
Integral Curb, and Sidewalks



BLAW-KNOX COMPANY  
PITTSBURGH, PA.

BULLETIN  
No. 1024

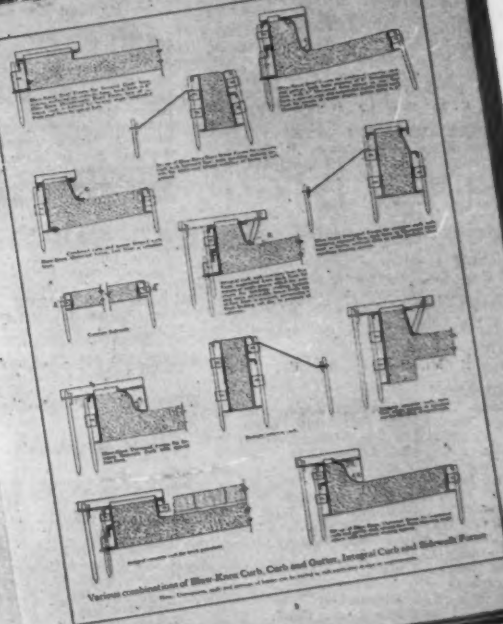
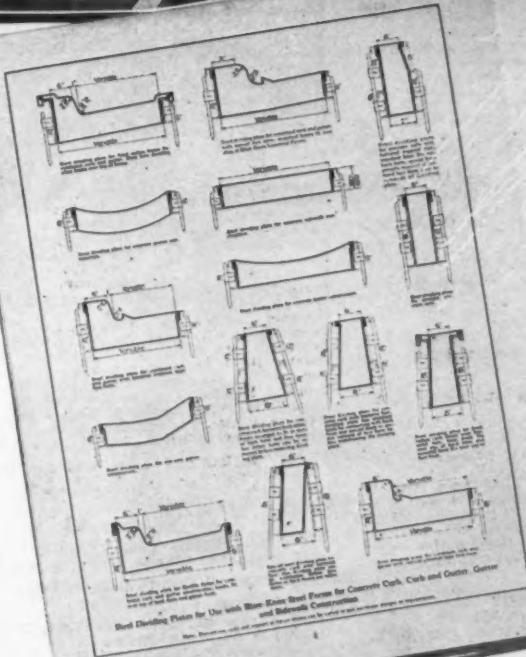
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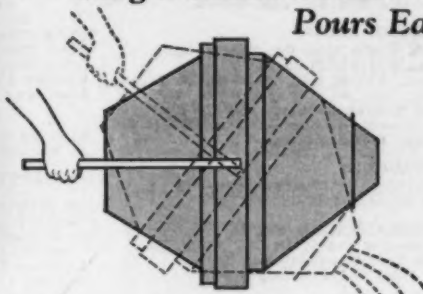
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**Walworth Mfg. Co., Boston**
- PNEUMATIC CONCRETE PLACERS**  
**\*Cement-Gun Co., Inc., Allentown, Pa.**  
**\*Ransome Concrete Machinery Co., Danellen, N. J.**
- PNEUMATIC GROUT MIXERS & PLACERS**  
**\*Cement-Gun Co., Inc., Allentown, Pa.**  
**\*Ransome Concrete Machinery Co., Danellen, N. J.**
- POLES, STEEL STRUCTURAL**  
**\*Blaw-Knox Co., Pittsburgh, Pa.**  
**Electric Railway Equipment Co., Cincinnati, O.**
- PORTABLE BUILDINGS**  
**\*Blaw-Knox Co., Pittsburgh, Pa.**  
**\*Truscon Steel Co., Youngstown, O.**  
**Littleford Bros., Cincinnati, O.**
- PORTABLE STEEL DERRICKS (See Derricks, Steel Portable)**
- PORTABLE WOOD WORKERS**  
**\*American Saw Mill Machinery Co., Hackettstown, N. J.**  
**\*Jones Superior Machine Co., Chicago**  
**Jaeger Portable Power Corp., Detroit.**
- PORTLAND CEMENT (See Cement)**
- POSTHOLE DIGGER**  
**\*Ransome Conc. Mch. Co., Danellen, N. J.**  
**American Shovel & Stamp Co., Lorain, O.**  
**Baldwin Tl. Works, Parkersburg, W. Va.**  
**Brown Mfg. Co., Zanesville, O.**  
**The Buda Co., Harvey, Ill.**  
**Champion Tl. Handle Works, Evert, Mich.**  
**Columbus Handle & Tool Corp., Columbus, Ind.**  
**Henry Diaston & Sons, Inc., Philadelphia, Pa.**  
**Empire Plow Co., Cleveland, O.**  
**Four Wheel Drive Auto Co., Clintonville, Wis.**  
**Franklin Equipment Co., Monticello, Iowa.**  
**Gibbs Mfg. Co., Canton, O.**  
**Gowanda Agricultural Works, Gowanda, N. Y.**  
**Hubbard & Co., Pittsburgh, Pa.**  
**Iron City Tool Works, Pittsburgh, Pa.**  
**Iwan Bros., South Bend, Ind.**  
**Klein-Logan Co., Pittsburgh, Pa.**  
**F. E. Kohler Co., Canton, O.**  
**Leetonia Tool Co., Leetonia, O.**  
**North Indianapolis Cradle Works, Indianapolis, Ind.**  
**Ohio Cultivator Co., Bellevue, O.**  
**Oliver Iron & Steel Corp., Pittsburgh, Pa.**  
**W. H. Osmundson, Perry, Iowa.**  
**Pech Foundry & Mfg. Co., Le Mars, Ia.**  
**Seymour Mfg. Co., Seymour, Ind.**  
**G. A. Swineford Co., Canton, O.**  
**Verona Tool Works, Pittsburgh, Pa.**  
**Warren Tool & Forge Co., Warren, O.**  
**Wood Shovel & Tool Co., Piqua, O.**  
**Western Steel & Iron Works, De Pere, Wis.**  
**Wyoming Shovel Works, Wyoming, Pa.**
- POWDER (See Explosives)**
- POWER PLANTS, INDUSTRIAL**  
**\*Continental Motors Corp., Muskegon, Mich.**  
**\*Hercules Motors Corp., Canton, O.**  
**\*Waukesha Motor Co., Waukesha, Wis.**  
**Alamd Engine Co., Hillsdale, Mich.**  
**Buda Co., Harvey, Ill.**  
**Climax Engine Co., Clinton, Iowa**  
**Hinkley Motors, Inc., Detroit.**  
**Sanderson-Cyclone Drill Co., Orrville, O.**  
**Servel Mfg. Co., Evansville, Ind.**  
**Wisconsin Motor Co., Milwaukee, Wis.**
- PRIMERS, AUTOMATIC**  
**\*American Steam Pump Co., Battle Creek, Mich.**  
**American Primer Co., Chicago, Ill.**
- PULLING MACHINES**  
**\*Beebe Bros. Inc., Seattle, Wash.**  
**\*Clyde Iron Works Sales Co., Duluth, Minn.**  
**John Waldron Corp., New Brunswick, N. J.**
- PUMP JACKS**  
**\*John Lauson Mfg. Co., New Holstein, N. J.**
- PUMPERS, FORD**  
**\*American Steam Pump Co., Battle Creek, Mich.**  
**Jaeger Portable Machinery Co., Detroit.**
- PUMPS, AIR LIFT**  
**\*American Steam Pump Co., Battle Creek, Mich.**  
**\*Sullivan Machinery Co., Chicago.**  
**Chicago Pneumatic Tool Co., New York**  
**Indiana Air Pump Co., Indianapolis**  
**Ingersoll-Rand Co., New York**
- PUMPS, CENTRIFUGAL**  
**\*American Steam Pump Co., Battle Creek, Mich.**  
**\*Barnes Mfg. Co., Mansfield, O.**  
**\*Domestic Eng. & Pump Co., Shippensburg, Pa.**  
**\*Humphreys Mfg. Co., Mansfield, Ohio**  
**\*Kysitone Driller Co., Beaver Falls, Pa.**  
**\*New Engine Co., Lansing, Mich.**  
**Aldrich Pump Co., Allentown, Pa.**  
**Allis-Chalmers Mfg. Co., Milwaukee**  
**American Well Works, Aurora, Ill.**  
**Aurora Pump & Mfg. Co., Aurora, Ill.**  
**Bethlehem Steel Co., Bethlehem, Pa.**  
**Buffalo Steam Pump Co., Buffalo, N. Y.**  
**A. S. Cameron Steam Pump Works, New York.**

\* Indicates that the manufacturer carries an advertisement. See index facing inside back cover.\*





This picture is reproduced from page 55 of the latest McKiernan-Terry Bulletin (see coupon below). It shows a No. 7 McKiernan-Terry Pile Hammer being used to demolish a two-story reinforced concrete garage, in New York. Ordinary wrecking methods were not fast enough, so the contractor tried this new method. The job was completed in less time and at lower cost than originally estimated. Several other large pictures of demolition jobs are shown in Bulletin 37, as well as all kinds of pile driving and pile pulling. *See coupon.*

## Demolition—another profitable use for McKiernan-Terry Pile Hammers

# McKiernan-Terry PILE HAMMERS

**McKIERNAN-TERRY DRILL COMPANY**  
19 Park Row, New York

Pile Hammers for heaviest concrete sheet and bearing piles, submarine pile driving, timber and pipe piles, heavy steel cylinders, batter piling, heaviest and lightest steel and wood sheeting, pile pulling, and demolition. Ten sizes, from 95 to 13,185 pounds

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or  
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Hedge & Matthews Company  
BUFFALO,  
H. B. Trevor Company  
CHICAGO,  
R. H. Hyland Company  
CLEVELAND,  
The Day & Maddock Company  
COLUMBIA, S. C.  
Carolina Contractors' Equipment & Supply Company  
COLUMBUS, O.,  
McNelly Machinery Company  
DALLAS,  
J. W. Bartholow Company  
DETROIT,  
Hunter Machinery Company  
DULUTH,  
Borchert-Ingersoll, Inc.  
FORT WORTH,  
J. W. Bartholow Company  
HOUSTON,  
R. B. Everett & Company  
JACKSONVILLE, FLA.,  
J. P. Benjamin  
KANSAS CITY, MO.,  
Funkhouser Equipment Company  
LOS ANGELES,  
Garlinghouse Brothers  
LOUISVILLE,  
Brandels Machinery & Supply Co.  
MOBILE,  
Turner Supply Company  
NEW ORLEANS,  
Ole K. Olsen  
NORFOLK,  
H. W. Sykes  
OKLAHOMA CITY,  
Funkhouser Equipment Company  
PHILADELPHIA,  
Beckwith Machinery Company  
PITTSBURGH,  
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PORTLAND, ORE.,  
Clyde Equipment Company  
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Jos. S. Potts, Jr. & Company  
ST. LOUIS,  
The Geo. F. Smith Company  
SALT LAKE CITY,  
The Gallagher Company  
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E. R. Bacon Company  
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Borchert-Ingersoll, Inc.  
SEATTLE,  
Clyde Equipment Company  
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The British Steel Piling Co., Ltd.,  
London, England

**or mail this**  
with your  
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To: McKiernan-Terry Drill Co.,  
19 Park Row, New York.

- ☐ Send your 100-page book of pile driving job pictures.
- ☐ Send your local representative.

# Where to Purchase

Chicago Pump Co., Chicago.  
Cook Motor Co., Delaware, O.  
Dayton-Dowd Co., Quincy, Ill.  
Dean Bros. Co., Indianapolis  
De Laval Steam Turbine Co., Trenton, N. J.  
Erie Pump & Engine Works, Medina, N. Y.  
Evinrude Motor Co., Milwaukee  
Fairbanks, Morse & Co., Chicago  
General Electric Co., Schenectady  
Goulds Pumps, Inc., Seneca Falls, N. Y.  
Indiana Air Pump Co., Indianapolis  
Ingersoll-Rand Co., New York  
La Bour Co., Chicago Heights, Ill.  
LeCourtney Co., Newark, N. J.  
Manitowoc Iron Works, Manitowish, Mich.  
Morris Machine Works, Baldwinville, N. Y.  
Ramsay Pump Co., Seneca Falls, N. Y.  
United Iron Works, Inc., Kansas City, Mo.  
Warren Steam Pump Co., Warren, Mass.  
Weinman Pump Mfg. Co., Columbus, O.  
Wheeler Condenser & Eng. Co., Carteret, N. J.  
Worthington Pump & Machinery Corp., N. Y.  
Yeomans Bros. Co., Chicago

## PUMPS, CONTRACTORS'

\*American Steam Pump Co., Battle Creek, Mich.  
\*Barnes Mfg. Co., Mansfield, O.  
\*Construction Machinery Co., Waterloo, Iowa  
\*Domestic Eng. & Pump Co., Shippensburg, Pa.  
\*Humphreys Mfg. Co., Mansfield, O.  
\*Kinney Mfg. Co., Boston  
\*John Lauson Mfg. Co., New Holstein, Wis.  
\*Novo Engine Co., Lansing, Mich.  
\*Waukesha Motor Co., Waukesha, Wis.  
Aldrich Pump Co., Allentown, Pa.  
Allis-Chalmers Mfg. Co., Milwaukee  
American Well Works, Aurora, Ill.  
Aurora Pump & Mfg. Co., Aurora, Ill.  
Buda Co., Harvey, Ill.  
A. S. Cameron Steam Pump Works, New York  
Ralph B. Carter Co., New York  
C. H. & E. Mfg. Co., Milwaukee  
Dayton-Dowd Co., Quincy, Ill.  
Deming Co., Salem, O.  
Emerson Pump & Valve Co., Alexandria, Va.  
Erie Pump & Engine Works, Medina, N. Y.  
Fairbanks, Morse & Co., Chicago  
Goulds Pumps, Inc., Seneca Falls, New York  
Ingersoll-Rand Co., New York  
Jaeger Portable Power Corp., Detroit  
La Bour Co., Chicago Heights, Ill.  
LeCourtney Co., Newark, N. J.  
Morris Machine Works, Baldwinville, N. Y.  
F. E. Myers & Bros. Co., Ashland, O.  
Fulcometer Steam Pump Co., New York  
Ramsay Pump Co., Seneca Falls, N. Y.  
Standard Scale & Supply Corp., Pittsburgh  
Van Noyhuys Machine Works, Albany, N. Y.  
Waldo Bros. & Bond Co., Boston, Mass.

## PUMPS, DEEP WELL

\*American Steam Pump Co., Battle Creek, Mich.  
\*Barnes Mfg. Co., Mansfield, O.  
\*Domestic Eng. & Pump Co., Shippensburg, Pa.  
\*Humphreys Mfg. Co., Mansfield, O.  
\*Keystone Driller Co., Beaver Falls, Pa.  
\*Novo Engine Co., Lansing, Mich.  
Aldrich Pump Co., Allentown, Pa.  
American Well Works, Aurora, Ill.  
A. S. Cameron Steam Pump Works, New York  
A. D. Cook, Inc., Lawrenceburg, Ind.  
Dean Bros. Co., Indianapolis  
Deming Co., Salem, O.  
Goulds Pumps, Inc., Seneca Falls, N. Y.  
Harris Air Pump Co., Indianapolis  
Indiana Air Pump Co., Indianapolis  
Ingersoll-Rand Co., New York  
Layne & Bowler, Inc., Memphis, Tenn.  
A. Y. McDonald Mfg. Co., Dubuque, Iowa  
Midwest Engineering Co., Indianapolis, Ind.  
F. E. Myers & Bros. Co., Ashland, O.  
Ramsay Pump Co., Seneca Falls, N. Y.  
United Iron Works, Inc., Kansas City, Mo.  
Weinman Pump Mfg. Co., Columbus, O.

## PUMPS, DIAPHRAGM

\*Barnes Mfg. Co., Mansfield, O.  
\*Construction Machinery Co., Waterloo, Ia.  
\*Domestic Eng. & Pump Co., Shippensburg, Pa.  
\*Humphreys Mfg. Co., Mansfield, O.  
\*Novo Engine Co., Lansing, Mich.  
\*White Engine Works, Kansas City, Mo.  
Aurora Pump & Mfg. Co., Aurora, Ill.  
Ralph B. Carter Co., New York  
C. H. & E. Mfg. Co., Milwaukee  
Deming Co., Salem, Ohio  
Dorr Co., New York  
Goulds Pumps, Inc., Seneca Falls, N. Y.  
Waldo Bros. & Bond Co., Boston, Mass.

## PUMPS, DREDGING

Ellisott Machinery Corp., Baltimore, Md.  
Erie Pump & Engine Co., Medina, N. Y.  
Morris Machine Works, Baldwinville, N. Y.

## PUMPS, GASOLINE AND OIL

\*Kinney Mfg. Co., Boston  
S. F. Bowser & Co., Inc., Ft. Wayne, Ind.  
Gilbert & Barker Mfg. Co., Springfield, Mass.  
Ingersoll-Rand Co., New York

Tokheim Oil Tank & Pump Co., Ft. Wayne, Ind.  
Wayne Tank & Pump Co., Ft. Wayne, Ind.

## PUMPS, PORTABLE

\*American Steam Pump Co., Battle Creek, Mich.  
\*Humphreys Mfg. Co., Mansfield, O.  
\*John Lauson Mfg. Co., New Holstein, Wis.  
Evinrude Motor Co., Milwaukee  
Jaeger Portable Power Corp., Detroit

## PUMPS, POWER

\*American Steam Pump Co., Battle Creek, Mich.  
\*Barnes Mfg. Co., Mansfield, O.  
\*Domestic Eng. & Pump Co., Shippensburg, Pa.  
\*Humphreys Mfg. Co., Mansfield, O.  
\*Kinney Mfg. Co., Boston  
\*Novo Engine Co., Lansing, Mich.  
\*Waukesha Motor Co., Waukesha, Wis.  
Alamo Iron Works, San Antonio, Texas  
Aldrich Pump Co., Allentown, Pa.  
Allis-Chalmers Mfg. Co., Milwaukee  
American Well Works, Aurora, Ill.  
Aurora Pump & Mfg. Co., Aurora, Ill.  
Chicago Pump Co., Chicago  
Dayton, Dowd Co., Quincy, Ill.  
De Laval Steam Turbine Co., Trenton, N. J.  
Deming Co., Salem, O.  
Evinrude Motor Co., Milwaukee  
Fairbanks, Morse & Co., Chicago  
Gardner-Denver Co., Quincy, Ill.  
Goulds Pumps, Inc., Seneca Falls, N. Y.  
Indiana Air Pump Co., Indianapolis  
Ingersoll-Rand Co., New York  
Lawrence Machinery Co., Lawrence, Mass.  
LeCourtney Co., Newark, N. J.  
F. E. Myers & Bros. Co., Ashland, O.  
Northern Fire Apparatus Co., Minneapolis  
Ramsay Pump Co., Seneca Falls, N. Y.  
Weinman Pump Mfg. Co., Columbus, O.  
Worthington Pump & Machinery Corp., N. Y.  
Yeomans Bros. Co., Chicago

## PUMPS, SEWAGE

\*American Steam Pump Co., Battle Creek, Mich.  
\*Barnes Mfg. Co., Mansfield, O.  
\*Humphreys Mfg. Co., Mansfield, O.  
American Well Works, Aurora, Ill.  
A. S. Cameron Steam Pump Works, New York  
Chicago Pump Co., Chicago  
Fairbanks, Morse & Co., Chicago  
Ingersoll-Rand Co., New York  
Pacific Flush Tank Co., Chicago and N. Y.  
Sanitation Corp., New York  
Warren Steam Pump Co., Warren, Mass.  
Yeomans Bros. Co., Chicago

## PUMPS, TAR AND ASPHALT

\*Kinney Mfg. Co., Boston  
Barber Asphalt Co., Philadelphia

## RADIATORS FOR GASOLINE ENGINES

McCord Radiator Mfg. Co., Detroit  
Modine Mfg. Co., Racine, Wis.  
Racine Radiator Co., Racine, Wis.  
Young Radiator Co., Racine, Wis.

## RAIL AND RAIL JOINTS

\*W. A. Zelnicker Supply Co., St. Louis, Mo.  
Bethlehem Steel Co., Bethlehem, Pa.  
Carnegie Steel Co., Pittsburgh, Pa.  
Easton Car & Construction Co., Easton, Pa.  
Koppel Ind. Car & Equipment Co., Koppel, Pa.  
Sweet's Steel Co., Williamsport, Pa.

## RAILROAD DITCHERS (See Excavators, Ditch and Trench)

## RECORDERS, WATER STAGE

Bristol Co., Waterbury, Conn.  
Builders Iron Fdry., Providence, R. I.  
W. & L. E. Gurley, Troy, N. Y.

## REFRIGERATING MACHINERY (See Ice Making Machinery)

## REINFORCING CONCRETE (See Concrete Reinforcement)

## RIVETERS, PNEUMATIC

\*The Bull Company, Chicago  
\*Independent Pne. Tool Co., Chicago  
Alliance Machine Co., Alliance, O.  
Chicago Pneumatic Tool Co., New York  
Cleveland Pneumatic Tool Co., Cleveland, O.  
Hanna Engineering Works, Chicago  
Helwig Mfg. Co., St. Paul, Minn.  
Ingersoll-Rand Co., New York  
Wm. H. Keller, Inc., Grand Haven, Mich.  
Shepherd Electric Crane & Hoist Co., Montour Falls, N. Y.  
Southwark Foundry & Machine Co., Phila.  
Watson-Stillman Co., New York

## RIVET SETS

\*Independent Pne. Tool Co., Chicago  
Chicago Pneumatic Tool Co., New York  
Cleveland Pneumatic Tool Co., Cleveland, O.  
Dunbar Drop Forge Co., Chicago  
Ingersoll-Rand Co., New York

## ROAD GRADERS, HORSE OR TRACTOR DRAWN

\*Austin Western Road Mch. Co., Chicago  
\*Baker Mfg. Co., Springfield, Ill.  
\*Good Roads Machinery Co., Kennett Sq., Pa.  
\*Russell Grader Mfg. Co., Minneapolis  
\*Gustav Schaefer Wagon Co., Cleveland  
J. D. Adams & Co., Indianapolis, Ind.  
Austin Mfg. Co., Chicago  
Banting Mfg. Co., Toledo, O.  
Beach Mfg. Co., Charlotte, Mich.  
C. D. Edwards Mfg. Co., Albert Lea, Minn.  
Gallon Iron Works & Mfg. Co., Gallon, O.  
Gilbert Mfg. Co., Aberdeen, S. D.  
Killefer Mfg. Co., Los Angeles  
Klauer Mfg. Co., Dubuque, Iowa  
Little Red Wagon Mfg. Co., Omaha  
Lyle Culvert & Road Equipment Co., Minneapolis  
N. S. Monroe & Sons, Arthur, Ill.  
New England Road Machy. Co., So. Boston, Mass.  
Owensboro Ditcher & Grader Co., Owensboro, Ky.  
Rome Mfg. Co., Rome, N. Y.  
Spears-Wells Machinery Co., Oakland, Cal.  
Stockland Road Machinery Co., Minneapolis  
Western Wheeled Scraper Co., Aurora, Ill.

## ROAD GRADERS, POWER

\*Acme Road Machine Co., Frankfort, N. Y.  
\*Austin Western Road Machy. Co., Chicago  
\*Good Roads Machinery Co., Kennett Sq., Pa.  
\*W. A. Riddell Co., Bucyrus, O.  
\*Russell Grader Mfg. Co., Minneapolis  
Gallon Iron Works & Mfg. Co., Gallon, O.  
Gilbert Mfg. Co., Aberdeen, S. D.  
Little Red Wagon Mfg. Co., Omaha  
Shaw-Enoch Tractor Co., Minneapolis  
Spears-Wells Machinery Co., Oakland, Cal.  
Wehr Co., Milwaukee

## ROAD MAINTAINERS, POWER

Spears-Wells Machinery Co., Oakland, Cal.

## ROAD OILS (See Oil, Road)

## ROAD OILERS

\*Austin Western Road Machy. Co., Chicago  
\*Goods Roads Mch. Co., Kennett Sq., Pa.  
\*Kinney Mfg. Co., Boston  
\*Mack Trucks, Inc., New York  
E. D. Etnyre & Co., Oregon, Ill.  
Municipal Supply Co., South Bend, Ind.  
Spears-Wells Machinery Co., Oakland, Cal.  
Truck Equipment Corp., Joliet, Ill.  
White Co., Cleveland

## ROAD PLOW

Spears-Wells Machinery Co., Oakland, Cal.

## ROAD SCRAPERS

\*Acme Road Machine Co., Frankfort, N. Y.  
\*Austin Western Road Machy. Co., Chicago  
\*Baker Mfg. Co., Springfield, Ill.  
\*Euclid Crane & Hoist Co., Euclid Village, O.  
\*Goods Roads Mch. Co., Kennett Sq., Pa.  
\*Miami Trailer-Scraper Co., Troy, Ohio  
\*Roderick Lean Co., Mansfield, O.  
\*Russell Grader Mfg. Co., Minneapolis  
\*Gustav Schaefer Wagon Co., Cleveland, O.  
J. D. Adams & Co., Indianapolis, Ind.  
Beach Mfg. Co., Charlotte, Mich.  
Davenport Mfg. Co., Los Angeles, Cal.  
Gallon Iron Works & Mfg. Co., Gallon, O.  
Gilbert Mfg. Co., Aberdeen, S. D.  
Killefer Mfg. Co., Los Angeles  
LaPlant-Chaste Mfg. Co., Cedar Rapids, Iowa  
Little Red Wagon Mfg. Co., Omaha  
Lyle Culvert & Road Equip. Co., Minneapolis  
Miskin Scraper Works, Ucon, Idaho  
Root Spring Scraper Co., Kalamazoo  
Shaw-Enoch Tractor Co., Minneapolis  
Sidney Steel Scraper Co., Sidney, O.  
Stockland Road Machinery Co., Minneapolis  
Western Wheeled Scraper Co., Aurora, Ill.

## ROAD SHOULDER MAINTAINER

Brabazon Mfg. Co., Stoughton, Wis.

## ROAD AND PAVING MACHINERY

\*Acme Road Machinery Co., Frankfort, N. Y.  
\*Austin Western Road Mch. Co., Chicago  
\*Baker Mfg. Co., Springfield, Ill.  
\*Blaw-Knox Co., Pittsburgh, Pa.  
\*Buffalo-Springfield Roller Co., Springfield, O.  
\*Caterpillar Tractor Co., San Leandro, Cal. and Peoria, Ill.  
\*Conner & Co., Inc., Philadelphia, Pa.  
\*Cleveland Tractor Co., Cleveland, O.  
\*Euclid Crane & Hoist Co., Euclid Village, O.  
\*Good Roads Machinery Co., Kennett Sq., Pa.  
\*Helsel St. Form & Iron Co., Warren, O.  
\*Joseph Honhorst Co., Cincinnati, O.  
\*Kinney Mfg. Co., Boston  
\*Krohnke Co., Milwaukee  
\*Lakewood Eng. Co., Cleveland, O.  
\*Mack Trucks, Inc., New York  
\*Russell Grader Mfg. Co., Minneapolis  
\*Gustav Schaefer Wagon Co., Cleveland  
\*T. L. Smith Co., Milwaukee  
J. D. Adams & Co., Indianapolis, Ind.  
Barber Asphalt Co., Philadelphia

If you find any errors or omissions in this Where to Purchase list, please send corrections to CONTRACTORS AND ENGINEERS MONTHLY



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The destructive water hammer—hammer—hammer—that's been wrecking pipe lines and pumps long before their time is whipped and whipped completely by Novo High Speed Triplex Road Pumps.

The Novo runs at 200 r. p. m. instead of the customary 65 r. p. m. That means 600 water strokes per minute. The rapidity of the water strokes reduces the hammering, caused by ordinary pumps, to a mere ripple. And the pressure at the mixer is steadier and stronger.

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*Novo Triplex Road Pump in Winter Service*

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# NOVO

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Service, parts and sales in 65 cities



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Beach Mfg. Co., Charlotte, Mich.  
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 P. D. Cummer & Son Co., Cleveland, O.  
 Easton Car & Construction Co., Easton, Pa.  
 C. D. Edwards Mfg. Co., Albert Lea, Minn.  
 Equitable Asphalt Maint. Co., Kansas City, Mo.  
 Erie Machine Shops, Erie, Pa.  
 J. D. Farasey Mfg. Co., Cleveland, O.  
 Gallon Iron Works & Mfg. Co., Gallon, O.  
 Gilbert Mfg. Co., Aberdeen, South Dak.  
 Geo. Haisa Mfg. Co., N. Y.  
 Littleford Bros., Cincinnati, O.  
 Little Red Wagon Mfg. Co., Omaha  
 New England Road Machy. Co., So. Boston, Mass.  
 Shaw-Enochs Tractor Co., Minneapolis  
 Slusser-McLean Scraper Co., Sidney, O.  
 Spears-Wellis Machinery Co., Oakland, Cal.  
 Universal Road Machy. Co., Kingston, N. Y.

## ROAD AND PAVING ROLLERS

\*Acme Road Machinery Co., Frankfort, N. Y.  
 \*Austin-Western Road Machy. Co., Chicago  
 \*Buffalo-Springfield Roller Co., Springfield, O.  
 \*Good Roads Machinery Co., Kennett Sq., Pa.  
 \*Huber Mfg. Co., Marion, Ohio  
 Austin Mfg. Co., Chicago  
 Banting Mfg. Co., Toledo, O.  
 Barber Asphalt Co., Philadelphia  
 Beach Mfg. Co., Charlotte, Mich.  
 J. I. Case Trenching Mach. Co., Racine, Wis.  
 Erie Machine Shops, Erie, Pa.  
 Gallon Iron Works & Mfg. Co., Gallon, O.  
 Horst & Strieter Co., Davenport, Iowa  
 Kinney Standards, Inc., Brooklyn, N. Y.  
 Wehr Co., Milwaukee

## ROCK CRUSHERS AND PULVERIZERS (See Crushers)

## ROCK DRILLS (See Drills, Rock)

## ROLLERS, LAWN, TRACTOR POWER

Kinney Standards, Inc., Brooklyn, N. Y.

## ROOFING, ASBESTOS, ASPHALT, COMPOSITION, TILE, ETC.

\*Barrett Co., New York  
 \*Phillip Carey Co., Cincinnati, O.  
 \*Standard Oil Co. (Indiana), Chicago  
 American Cement Tile Mfg. Co., Pittsburgh  
 Atlantic Refining & Asphalt Corp., Phila., Pa.  
 Barber Asphalt Co., Philadelphia  
 Beaver Products Co., Inc., Buffalo, N. Y.  
 Bird & Son, Inc., East Walpole, Mass.  
 Certain-teed Products Corp., New York  
 Chatfield Mfg. Co., Cincinnati, O.  
 Edwards Mfg. Co., Cincinnati, O.  
 Euclid Chemical Co., Cleveland  
 Flintkote Co., Boston  
 Johns-Manville, Inc., New York  
 Keystone Roofing Mfg. Co., York, Pa.  
 The Lehigh Co., Chicago  
 F. J. Lewis Mfg. Co., Chicago  
 National Roofing Co., Tonawanda, N. Y.  
 National Sheet Metal Roofing Co., Jersey City, N. J.  
 Ruberoid Co., New York  
 Sall Mountain Co., Chicago  
 Sifo Products Co., St. Paul, Minn.  
 L. Sonneborn & Sons, Inc., New York  
 Texas Co., New York  
 Western Elastite Roofing Co., Denver

## ROOFING, METAL

\*Blaw-Knox Co., Pittsburgh, Pa.  
 \*Truscon Steel Co., Youngstown, O.  
 American Rolling Mill Co., Middletown, O.  
 American Sheet & Tin Plate Co., Pittsburgh  
 Central Alloy Steel Corp., Massillon, O.  
 Edwards Mfg. Co., Cincinnati, O.  
 Kluener Mfg. Co., Dubuque, Iowa  
 Milwaukee Corr. Co., Milwaukee  
 Republic Iron & Steel Co., Youngstown, O.  
 Youngstown Sheet & Tube Co., Youngstown, Ohio

## ROOFING KETTLES (See Kettles)

## ROOTERS

\*Ted Carr & Co., Chicago  
 \*Lakewood Eng. Co., Cleveland, O.

## ROPE, MANILA

American Mfg. Co., Brooklyn, N. Y.  
 Columbian Rope Co., Auburn, N. Y.  
 Cupples Cordage Co., Brooklyn, N. Y.  
 Hooven & Allison Co., Xenia, O.  
 R. A. Kelly Co., Xenia, O.  
 N. Bedford Cordage Co., N. Bedford, Mass.  
 Peoria Cordage Co., Peoria, Ill.  
 Plymouth Cordage Co., N. Plymouth, Mass.  
 Portland Cordage Co., Portland, Ore.  
 Tabbs Cordage Co., San Francisco  
 Wall Rope Works, New York  
 Waterbury Co., New York  
 Whitlock Cordage Co., New York

## ROPE, WIRE, HOISTING, HAULAGE

\*American Steel & Wire Co., Chicago  
 \*Williamsport Wire Rope Co., Williamsport, Pa.  
 American Cable Co., Inc., New York  
 Broderick & Bascom Rope Co., St. Louis, Mo.  
 Fischer & Hayes Rope & Steel Co., Chicago  
 Hazard Insulated Wire Wks., Wilkesbarre, Pa.

A. Leachen & Sons Rope Co., St. Louis  
 Macwhyte Co., Kenosha, Wis.  
 J. A. Roebeling's Sons Co., Trenton, N. J.  
 Upson-Walton Co., Cleveland, O.  
 Waterbury Co., New York  
 Wickwire Spencer Steel Co., New York

## RUBBER TIRES (See Tires)

## RULES

\*Lufkin Rule Co., Saginaw, Mich.

## SALAMANDERS

\*Asroll Burner Co., West New York, N. J.  
 \*General Wheelbarrow Co., Cleveland, O.  
 \*Joseph Hornherst Co., Cincinnati, O.  
 Hauck Mfg. Co., Brooklyn, N. Y.  
 Jackson Mfg. Co., Harrisburg  
 Littleford Brothers, Cincinnati, O.

## SAFETY TREADS (See Treads, Safety)

## SASH ROLLER STEEL (See Window Frames and Sash)

## SAW HORSES

Everhot Mfg. Co., Maywood, Ill.

## SAW RIGS, PORTABLE

\*American Saw Mill Machinery Co., Hackettstown, N. J.  
 \*John Lanson Mfg. Co., New Holstein, Wis.  
 Beach Mfg. Co., Montrose, Pa.  
 C. H. & E. Mfg. Co., Milwaukee  
 De Walt Products Co., Leola, Pa.  
 Jones Superior Machine Co., Chicago  
 Knickerbocker Co., Jackson, Mich.  
 Leach Co., Oshkosh, Wis.  
 Witte Engine Works, Kansas City, Mo.

## SAWS, HAND, POWER

\*Read-Prentice Corp., Worcester, Mass.  
 Electric-Magneto Tool Co., Chicago  
 Flexway Corp., Cincinnati, O.  
 Ingersoll-Rand Co., New York  
 Michel Electric Hand Saw Co., Chicago  
 Porter Cable Machinery Co., Syracuse  
 F. L. Rogers & Co., Chicago  
 Skilaw, Inc., Chicago, Ill.  
 Tousley Tool Co., Cleveland, Ohio  
 Wappat Gear Works, Pittsburgh, Pa.  
 Witte Engine Works, Kansas City, Mo.

## SCARIFIERS

\*Acme Road Machinery Co., Frankfort, N. Y.  
 \*Austin-Western Road Machy. Co., Chicago  
 \*Buffalo-Springfield Roller Co., Springfield, O.  
 \*Good Roads Mach. Co., Kennett Sq., Pa.  
 \*Huber Mfg. Co., Marion, O.  
 \*Russell Grader Mfg. Co., Minneapolis  
 Austin Mfg. Co., Chicago  
 Banting Mfg. Co., Toledo, O.  
 Barber Asphalt Co., Philadelphia  
 C. D. Edwards Mfg. Co., Albert Lea, Minn.  
 Gallon Iron Works & Mfg. Co., Gallon, O.  
 Kluener Mfg. Co., Dubuque, Iowa  
 Rome Mfg. Co., Rome, N. Y.  
 Universal Road Machy. Co., Kingston, N. Y.

## SCARIFIERS, TEETH FOR

\*Russell Grader Mfg. Co., Minneapolis  
 Gallon Iron Works & Mfg. Co., Gallon, O.  
 Shunk Mfg. Co., Bucyrus, O.

## SCOOPS, SKIMMER AND TRENCH

\*Bay City Dr. Works, Bay City, Mich.  
 \*Keystone Driller Co., Beaver Falls, Pa.

## SCRAPERS, DRAGLINE

\*Garst Mfg. Company, Chicago  
 \*Link-Belt Co., Chicago  
 \*Russell Grader Mfg. Co., Minneapolis  
 \*Sauerman Bros., Chicago  
 Beach Mfg. Co., Charlotte, Mich.

## SCRAPERS, POWER DRAG

\*Garst Mfg. Company, Chicago  
 \*Russell Grader Mfg. Co., Minneapolis  
 \*Sauerman Bros., Chicago

## SCRAPERS, ROAD (See Road Scrapers)

## SCRAPERS, SELF-LOADING

\*Baker Mfg. Co., Springfield, Ill.  
 \*Euclid Crane & Hoist Co., Euclid Village, O.  
 \*Miami Trailer-Scaper Co., Troy, O.  
 \*Roderick Lean Co., Mansfield, O.  
 \*Russell Grader Mfg. Co., Minneapolis  
 \*Gustav Schaefer Wagon Co., Cleveland  
 Atlas Scraper Co., Los Angeles, Calif.  
 Davenport Mfg. Co., Los Angeles, Cal.  
 Perry Co., Sidney, Ohio

## SCREENS, SAND, GRAVEL AND COAL

\*Acme Road Machinery Co., Frankfort, N. Y.  
 \*Austin-Western Road Machinery Co., Chicago  
 \*Chicago Automatic Conv. Co., Chicago  
 \*Good Roads Machinery Co., Kennett Sq., Pa.  
 \*Link-Belt Co., Chicago  
 \*Russell Grader Mfg. Co., Minneapolis  
 Allis-Chalmers Mfg. Co., Milwaukee

Atlas Engineering Co., Milwaukee, Wis.  
 Austin Mfg. Co., Chicago  
 C. O. Bartlett & Snow Co., Cleveland, O.  
 Beach Mfg. Co., Charlotte, Mich.  
 Brown Hoisting Machinery Co., Cleveland, O.  
 Chain Belt Co., Milwaukee, Wis.  
 Deister Concentrator Co., Ft. Wayne, Ind.  
 Gallon Iron Works & Mfg. Co., Gallon, O.  
 Gifford-Wood Co., Hudson, N. Y.  
 Geo. Haisa Mfg. Co., N. Y.  
 Hendrick Mfg. Co., Carbondale, Pa.  
 Jeffrey Mfg. Co., Columbus, O.  
 Littleford Bros., Cincinnati, O.  
 Lyle Culvert & Road Equipment Co., Minneapolis, Minn.  
 Morrow Mfg. Co., Wellston, O.  
 Newage Engineering Co., Newage, Mich.  
 New Holland Machinery Co., New Holland, Pa.  
 New Jersey Wire Cloth Co., Trenton, N. J.  
 Robins Conv. Belt Co., New York  
 H. B. Sackett Screen & Chute Co., Chicago  
 Smith Engineering Works, Milwaukee, Wis.  
 Universal Crusher Co., Cedar Rapids, Iowa  
 Universal Road Machine Co., Kingston, N. Y.  
 Webster Mfg. Co., Chicago  
 Weller Mfg. Co., Chicago  
 Wickwire Spencer Steel Co., New York

## SCREENS, SEWAGE

\*Link-Belt Co., Philadelphia  
 Dorr Co., New York  
 Green Bay Foundry & Machine Works, Green Bay, Wis.  
 Sanitation Corporation, New York  
 Simplex Ejector Co., Chicago

## SEWAGE DISINFECTION

\*Wallace & Tiernan Co., Inc., Newark, N. J.

## SEWAGE DISPOSAL APPARATUS

\*Link-Belt Co., Chicago  
 Dorr Co., New York  
 Pacific Flush Tank Co., Chicago and N. Y.  
 Sanitation Corporation, New York  
 Simplex Ejector Co., Chicago

## SEWAGE EJECTORS

Pacific Flush Tank Co., Chicago and N. Y.  
 Sanitation Corporation, New York  
 Simplex Ejector Co., Chicago  
 Yeoman Bros. Co., Chicago

## SEWAGE PUMPS (See Pumps)

## SEWER BLOCKS, SEGMENT

American Vit. Products Co., Akron, O.  
 Cannelton Sewer Pipe Co., Cannelton, Ind.  
 Denver Sewer Pipe & Clay Co., Denver, Col.  
 W. S. Dickey Clay Mfg. Co., Kansas City, Mo.  
 Evans & Howard Fire Brick Co., St. Louis, Mo.  
 Laclede Clowdy Clay Prod. Co., St. Louis, Mo.  
 Macomb Sewer Pipe Works, Macomb, Ill.  
 Pacific Clay Products Co., Los Angeles, Cal.  
 Red Wing Sewer Pipe Co., Red Wing, Minn.  
 Robinson Clay Products Co., Akron, O.  
 Standard Fire Brick & Sewer Pipe Co., Pueblo, Col.

## SEWER BRACES

\*Templeton, Kenly & Co., Chicago

## SEWER CLEANING APPARATUS

F. Bissell Co., Toledo, O.  
 Champion Corp., Hammond, Ind.  
 Self Propelling Nozzle Co., New York  
 Turbine Sewer Machine Co., Milwaukee

## SEWER PIPE AND DRAIN TILE

American Vit. Products Co., Akron, Ohio  
 Blackmer & Post Pipe Co., St. Louis  
 William E. Dee Co., Chicago  
 Denver Sewer Pipe & Clay Co., Denver, Col.  
 W. S. Dickey Clay Mfg. Co., Kansas City, Mo.  
 Evans & Howard Fire Brick Co., St. Louis  
 Logan Clay Products Co., Logan, O.  
 Ohio Vit. Pipe Co., Uhrichsville, O.  
 Patton Clay Mfg. Co., Patton, Pa.  
 Red Wing Sewer Pipe Co., Red Wing, Minn.  
 Robinson Clay Prod. Co., Akron, O.  
 Streator Clay Mfg. Co., Streator, Ill.

## SEWER PIPE FORMS

\*Heltzel Steel Form & Iron Co., Warren, O.  
 Raber & Lang Mfg. Co., Kendallville, Ind.

## SEWER PIPE JOINT COMPOUNDS

G. K. Sales Agency, Macungie, Pa.  
 Pacific Flush Tank Co., Chicago and N. Y.  
 Ruberoid Co., New York  
 Serviced Products Corp., Chicago  
 Conc. Form Co., Inc., Syracuse, N. Y.  
 Quinn Wire & Iron Wks., Boone, Ia.

## SEWER RODS

F. Bissell Co., Toledo, O.  
 Champion Corp., Hammond, Ind.  
 Luck Sewer Equipment Co., Chicago  
 Turbine Sewer Machine Co., Milwaukee

## SHARPENERS, DRILL STEEL

\*Sullivan Machinery Co., Chicago  
 Gardner-Denver Co., Quincy, Ill.

\* Indicates that the manufacturer carries an advertisement. See index facing inside back cover.\*



Here's a shovel manufacturer you may depend upon—

THE OSGOOD COMPANY—they use

## WILLIAMSPORT WIRE Telfax Tape Marked Factory Certified ROPE

as standard equipment on their shovels

That is ample reason for placing your confidence in *their* machines as well as any other machines going out so equipped. Run over their specifications and it's ten chances to one you'll find every accessory up to Williamsport quality standard. It's a safe way to guide you in your purchases. They cannot be fooled on Williamsport quality—neither can you because it's the *only* wire rope that shows its grade by plain English, unalterable factory proof.

Life is too sacred and time is too valuable to use wire rope the grade, of which you cannot positively determine—the “say so” of anyone is not sufficient—Get *proof!* It costs less in the end.

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Williamsport, Pa.

General Sales Office  
Peoples Gas Bldg., Chicago

**USE MADESCO MADE BLOCKS—THEY STAND THE GAFF**

# Where to Purchase

Hardsoeg Wonder Drill Co., Ottumwa, Ia.  
Ingersoll-Rand Co., New York

## SHINGLES, METAL

Aluminum Co. of America, Pittsburgh, Pa.  
Berger Mfg. Co., Canton, O.  
Edwards Mfg. Co., Cincinnati, O.  
Klauer Mfg. Co., Dubuque, Iowa  
Milwaukee Corrugating Co., Milwaukee  
National Sheet Metal Roofing Co., Jersey City, N. J.  
Newport Rolling Mill Co., Newport, Ky.  
Penn Metal Co., Boston  
Tiffin Art Metal Co., Tiffin, Ohio  
Wheeling Metal Mfg. Co., Wheeling, W. Va.

## SHORES

\*M. & M. Wire Clamp Co., Minneapolis  
Concrete Engineering Co., Omaha, Neb.  
Dayton Sure Grip & Shore Co., Dayton, O.  
Fischer & Hayes Rope & Steel Co., Chicago  
The O. D. G. Co., Owensboro, Ky.  
H. W. Root Co., Cincinnati, O.  
Roe-Meyer-Hecht Co., Cincinnati, O.  
Symons Clamp & Mfg. Co., Chicago  
Universal Form Clamp Co., Chicago

## SHOVELS, CRAWLING TRACTOR

\*Bucyrus-Erie Co., Erie, Pa.  
\*The Shovel Co., Lorain, Ohio  
American Hoist & Derrick Co., St. Paul  
Speeder Mch. Corp., Cedar Rapids, Ia.

## SHOVELS, ELECTRIC

\*Bay City Dredge Works, Bay City, Mich.  
\*Bucyrus-Erie Co., Erie, Pa.  
\*Byers Mach. Co., Ravenna, Ohio  
\*Kochring Co., Milwaukee, Wis.  
\*Link-Belt Co., Chicago  
\*The Shovel Co., Lorain, Ohio  
American Hoist & Derrick Co., St. Paul  
Industrial Brownhoist Corp., Cleveland  
Marion Steam Shovel Co., Marion, O.  
Osgood Co., Marion, Ohio  
Speeder Mch. Corp., Cedar Rapids, Ia.

## SHOVELS, GASOLINE

\*Bay City Dredge Works, Bay City, Mich.  
\*Bucyrus-Erie Co., Erie, Pa.  
\*Byers Machine Co., Ravenna, Ohio  
\*Insley Mfg. Co., Indianapolis  
\*Keystone Driller Co., Beaver Falls, Pa.  
\*Kochring Co., Milwaukee, Wis.  
\*Link-Belt Co., Chicago  
\*Star Drilling Machine Co., Akron, Ohio  
\*The Shovel Co., Lorain, Ohio  
American Hoist & Derrick Co., St. Paul  
American Steel Dredge Co., Ft. Wayne, Ind.  
Austin Machine Corp., Muskegon, Mich.  
General Excavator Co., Marion, Ohio  
Harnischfeger Corp., Milwaukee, Wis.  
Industrial Brownhoist Corp., Cleveland  
Marion Steam Shovel Co., Marion, O.  
McMyler Interstate Co., Cleveland, O.  
Mead-Morrison Mfg. Co., Boston  
Northwest Engineering Works, Chicago  
Orion Crane & Shovel Co., Chicago  
Osgood Co., Marion, O.  
Speeder Mch. Corp., Cedar Rapids, Ia.  
Universal Power Shovel Co., Highland Park, Mich.

## SHOVELS, GASOLINE (FORDSON)

\*Insley Mfg. Co., Indianapolis, Ind.  
\*Trackson Co., Milwaukee, Wis.  
Anthony Co., Streator, Ill.  
Hughes-Keenan Co., Cleveland  
Mandt Company, Keokuk, Iowa  
Milwaukee Electric Crane & Mfg. Co., Milwaukee  
Squier-Rix Co., Milwaukee  
Universal Power Shovel Co., Highland Park, Mich.

## SHOVELS, STEAM

\*Bucyrus-Erie Co., Erie, Pa.  
\*Keystone Driller Co., Beaver Falls, Pa.  
\*The Shovel Co., Lorain, Ohio  
American Hoisting & Derrick Co., St. Paul  
Bellwood Steam Shovel Co., Bellwood, Pa.  
Industrial Brownhoist Corp., Cleveland  
Marion Steam Shovel Co., Marion, Ohio  
Orion Crane & Shovel Co., Chicago  
Osgood Co., Marion, Ohio  
Russell & Co., Massillon, Ohio

## SHOVELS, SPADES AND SCOOPS

American Mfg. Co., Chattanooga, Tenn.  
Ames Shovel & Tool Co., Boston  
Baldwin Tool Works, Parkersburg, W. Va.  
Beall Bros. Co., Alton, Ill.  
Connaut Shovel Co., Connaut, Ohio  
Hubbard & Co., Pittsburgh, Pa.  
Indiana Shovel Co., New Castle, Ind.  
Jackson Shovel Co., Montpelier, Ind.  
Pittsburgh Shovel Co., Pittsburgh, Pa.  
Russell Shovel Co., Aliquippa, Pa.  
Stevens-Webb Co., Inc., Altoona, Pa.  
Union Furnace Mfg. Co., Altoona, Pa.  
Wood Shovel & Tool Co., Piqua, Ohio  
Wyoming Shovel Works, Wyoming, Pa.

## SIDEWALK AND ROAD FORMS (See Forms, Concrete)

**SIEVES, TESTING, SAND AND GRAVEL**  
Audubon Wire Cloth Co., Audubon, N. J.  
Elmer & Amend, New York, N. Y.  
Newark Wire Cloth Co., Newark, N. J.  
W. S. Tyler Co., Cleveland, Ohio

## SIGNS, STREET AND ROAD

Alumoyd Sign & Signal Co., Chicago  
Auto Sign Display Co. of Missouri, St. Louis, Mo.  
Baltimore Enamel & Novelty Co., Baltimore  
Elkhart Foundry & Machine Co., Elkhart, Ind.  
Evernu-Century Sign Co., Boston  
Ingram-Richardson Mfg. Co., Beaver Falls, Pa.  
Lyle-Signs, Minneapolis, Minn.  
Municipal Street Sign Co., New York  
Ohio Traffic Devices Co., Columbus  
Rochester Street Signal Co., Rochester, N. Y.  
Standard Mfg. Co., Cedar Falls, Iowa  
Union Iron Products Co., E. Chicago, Ind.  
Western Stamping & Mfg. Co., St. Paul

## SLEEVES, TAPPING AND VALVE

Mueller Company, Decatur, Ill.  
Ronsseier Valve Co., Troy, N. Y.  
A. P. Smith Mfg. Co., East Orange, N. J.

## SLUCE GATES (See Gates, Sluice)

## SLUMP CONES

American Can Co., Chicago, Ill.  
Elmer & Amend, New York, N. Y.

## SNOKE STACKS (See Stacks, Steel)

## SNOW REMOVAL MACHINERY

\*Austin-Western Road Machinery Co., Chicago  
\*Baker Mfg. Co., Springfield, Ill.  
\*Barber-Greene Co., Aurora, Ill.  
\*Byers Machine Co., Ravenna, Ohio  
\*Caterpillar Tractor Co., San Leandro, Cal., and Peoria, Ill.  
\*Cleveland Tractor Co., Cleveland, Ohio  
\*Good Roads Machinery Co., Kennett Sq., Pa.  
\*The Heil Company, Milwaukee, Wis.  
\*Mack Trucks, Inc., New York  
\*Monarch Tractors Corp., Springfield, Ill.  
\*W. A. Riddell Co., Bucyrus, Ohio  
\*Russell Grader Mfg. Co., Minneapolis  
Austin Mfg. Co., Chicago  
C. D. Edwards Mfg. Co., Albert Lea, Minn.  
Fox Rotary Snow Broom Co., New York  
George Halsey Mfg. Co., New York  
Hilway Service Corp., Wausau, Wis.  
Killefer Mfg. Co., Los Angeles, Cal.  
Klauer Mfg. Co., Dubuque, Iowa  
LaPlant-Chaste Mfg. Co., Cedar Rapids, Iowa  
Linn Mfg. Co., Morris, N. Y.  
Mead-Morrison Mfg. Co., E. Boston  
N. P. Nelson Co., Passaic, N. J.  
New England Road Machy. Co., So. Boston, Mass.  
Owensboro Ditcher & Grader Co., Owensboro, Ky.  
Rightway Corporation, Chicago, Ill.  
Rotary Snow Plow Co., Minneapolis  
Shaw-Enochs Tractor Co., Minneapolis  
W. M. Toy Co., Sidney, Ohio  
Union Iron Works, Inc., Bangor, Me.  
Walsh's Holyoke St. Blr. Wks., Holyoke, Mass.  
Walter Snow Fighters, L. I. City, N. Y.  
Wausau Iron Works, Wausau, Wis.

## SNOW FENCING

\*Good Roads Machinery Co., Kennett Sq., Pa.  
Cyclone Fence Co., Waukegan, Ill.  
Wickwire-Spencer Steel Co., New York

## SPADES (See Shovels)

## SPRAYERS, ASPHALT AND TAR

\*Kinney Mfg. Co., Boston  
Littleford Bros., Cincinnati

## SPRAYING MACHINERY FOR TREES

Bean Spray Pump Co., Lansing, Mich.  
Field Force Pump Co., Elmira, N. Y.  
Fitzhenry-Guptill Co., E. Cambridge, Mass.  
Hardie Mfg. Co., Hudson, Mich.

## SPRAY PAINTING MACHINERY (See Painting Machinery)

## SPREADERS, SAND

\*Good Roads Machy. Co., Kennett Square, Pa.  
\*Warren Bros. Co., Boston, Mass.  
Goroco Mechanical Spreader Co., Philadelphia  
Highway Service Co., New Bedford, Mass.  
Tarrant Co., Saratoga Springs, N. Y.

## SPREADERS, STONE

\*Austin-Western Road Machinery Co., Chicago  
\*The Burch Corp., Crestline, O.  
Gallon Iron Works & Mfg. Co., Gallon, Ohio  
Shaw-Enochs Tractor Co., Minneapolis  
Universal Road Machinery Co., Kingston, N. Y.

## STACKS, STEEL

\*Blaw-Knox Co., Pittsburgh, Pa.  
\*Connery & Co., Inc., Philadelphia  
\*Heil Co., Milwaukee, Wis.  
\*Heitzel St. Form & Iron Co., Warren, O.  
\*Joseph Heubert Co., Cincinnati, Ohio

Birmingham Tank Co., Birmingham, Ala.  
Canton Art Metal Co., Canton, O.  
Chattanooga Boiler & Tank Co., Chattanooga, Tenn.  
Chicago Bridge & Iron Works, Chicago  
Graver Corp., Chicago  
Lancaster Iron Works, Inc., Lancaster, Pa.  
Littleford Bros., Cincinnati, Ohio  
New York Central Iron Works Co., Inc., Hagerstown, Md.  
Tippett & Wood, Phillipsburg, Pa.  
Petroleum Iron Works Co., Sharon, Pa.  
Pittsburgh-Des Moines Steel Co., Pittsburgh, Pa.  
W. B. Scaife & Sons, Pittsburgh, Pa.  
Walsh & Weidner Boiler Co., Chattanooga, Tenn.

## STANDPIPES AND ELEVATED TANKS

W. E. Caldwell Co., Louisville, Ky.  
Chatta. Blr. & Tank Co., Chattanooga, Tenn.  
Chicago Bridge & Iron Works, Chicago  
E. D. Cole Mfg. Co., Newman, Ga.  
Lancaster Iron Works, Lancaster, Pa.  
Pacific Tank & Pipe Co., San Francisco  
Petroleum Iron Works Co., Sharon, Pa.  
Pittsburgh-Des Moines Steel Co., Pittsburgh, Pa.  
Tippett & Wood, Phillipsburg, Pa.  
United Iron Works, Inc., Kansas City, Mo.  
Walsh & Weidner Boiler Co., Chattanooga, Tenn.

## STEAM SHOVELS (See Shovels, Steam)

## STEEL PLATE CONSTRUCTION

\*Blaw-Knox Co., Pittsburgh, Pa.  
\*Connery & Co., Philadelphia  
\*Heil Co., Milwaukee, Wis.  
\*Heitzel St. Form & Iron Co., Warren, Ohio  
\*Joseph Heubert Co., Cincinnati, Ohio  
\*Union Iron Works, Inc., Hoboken, N. J.  
Bethlehem Steel Co., Bethlehem, Pa.  
Biggs Boiler Works, Akron, Ohio  
Birmingham Tank Co., Birmingham, Ala.  
Chatta. Boiler & Tank Co., Chattanooga, Tenn.  
Chicago Bridge & Iron Works, Chicago  
Graver Corp., East Chicago, Ill.  
Hendrick Mfg. Co., Carbondale, Pa.  
Lancaster Iron Works, Inc., Lancaster, Pa.  
Littleford Bros., Cincinnati, Ohio  
McClintic-Marshall Co., Pittsburgh, Pa.  
New York Central Iron Works Co., Inc., Hagerstown, Md.  
Pennsylvania Bridge Co., Beaver Falls, Pa.  
Petroleum Iron Works Co., Sharon, Pa.  
Pittsburgh-Des Moines Steel Co., Pittsburgh, Pa.  
Ritter-Conley Co., Pittsburgh, Pa.  
W. B. Scaife & Sons, Pittsburgh, Pa.  
Walsh & Weidner Blr. Co., Chattanooga, Tenn.

## STEEL SHEET PILING

\*Wemlinger, Inc., New York

## STEEL TOWERS, CONCRETE

\*Insley Mfg. Co., Indianapolis, Ind.  
\*Ransome Conc. Machinery Co., Dunellen, N. J.

## STOKERS, MECHANICAL

Automatic Furnace Co., Dayton, Ohio  
Babcock & Wilcox Co., New York  
Combustion Engineering Corp., New York  
Detroit Stoker Co., Detroit  
Green Eng. Co., East Chicago, Ind.  
Sanford Riley Stoker Co., Worcester, Mass.  
Westinghouse Electric & Mfg. Co., E. Pittsburgh, Pa.

## STREET AND ROAD SIGNS (See Signs)

## STREET BROOMS

Independent Brush & Broom Mfg. Co., Indianapolis, Ind.  
Kendallville Broom & Brush Co., Kendallville, Ind.  
Lang Broom Co., Pittsburgh, Pa.  
Joseph Lay Co., Portland, Ind.  
Osborn Mfg. Co., Cleveland, O.  
Standard Brush & Broom Co., Chicago

## STREET CLEANERS' CARTS

Durlach Can & Iron Works, Brooklyn, N. Y.  
Rochester Can Co., Rochester, N. Y.  
Tarrant Mfg. Co., Saratoga Springs, N. Y.

## STREET FLUSHERS AND SPRINKLERS

\*Austin-Western Road Mch. Co., Chicago  
\*Heil Co., Milwaukee, Wis.  
\*Kinney Mfg. Co., Boston  
\*Mack Trucks, Inc., New York  
\*Whitehead & Kales Co., Detroit  
Austin Mfg. Co., Chicago  
Autocar Co., Ardmore, Pa.  
E. D. Etnyre & Co., Oregon, Ill.  
Federal Motor Truck Co., Detroit  
Gallon Iron Works & Mfg. Co., Gallon, Ohio  
General Motors Truck Co., Chicago  
Charles Hvas & Co., New York  
Municipal Supply Co., South Bend, Ind.  
Truck Equipment Corp., Joliet, Ill.  
White Co., Cleveland, Ohio



# Gouges Out the Toughest



**C**LAY is tough but rock is tougher. Ability to dig in and tear loose in hard, tough going, is one of the first requirements of a power shovel.

The exceptionally well designed, strong, all-manganese steel dipper, standard equipment on all Link-Belt Shovels, is built to endure the terrific impact due to the powerful push of the Link-Belt crowding mechanism.

When you examine the Link-Belt Shovel part by part, you find one of the reasons why a Link-Belt Shovel is so easy to operate. Send for Bulletin No. B-10.

## LINK-BELT COMPANY

3349

Builders of Locomotive Cranes for 30 years. Portable Loaders—Crawler Cranes—Shovels—Draglines

CHICAGO, 300 W. Pershing Road

Offices in Principal Cities

# LINK-BELT SHOVEL

# Where to Purchase

## STREET LIGHTING EQUIPMENT

\*Hove Engine Co., Lansing, Mich.  
American Conc. Prod. Co., Forest Park, Ill.  
Chicago Conc. Prod. Co., Chicago  
J. B. Clow & Sons, Chicago  
Electric Ry. Equipment Co., Cincinnati, O.  
Hilophane Co., New York  
King Mfg. Co., Chicago  
Line Material Co., So. Milwaukee, Wis.  
Logan Co., Louisville, Ky.  
J. L. Mott Iron Works, New York  
J. S. Schofield's Sons Co., Macon, Ga.  
Union Metal Mfg. Co., Canton, O.  
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

## STREET SIGNS (See Signs, Street)

## STREET SWEEPERS

\*Austin-Western Road Mch. Co., Chicago.  
\*Kinney Mfg. Co., Boston  
\*Whitehead & Kales Co., Detroit  
Austin Mfg. Co., Chicago  
Butler Mfg. Co., Cleveland, O.  
Elgin Sales Corp., New York

## STREET SWEEPER BROOMS REFILLED

Kendallville Broom & Brush Co., Kendallville, Ind.  
Lang Broom Co., Pittsburgh, Pa.  
Joseph Lay Co., Portland, Ind.  
Osborn Mfg. Co., Cleveland, Ohio  
Standard Brush & Broom Mfg. Co., Chicago

## STUMP PULLERS

\*Boebe Bros., Inc., Seattle, Wash.  
\*Ernst Mfg. Co., Portland, O.  
H. L. Bennett & Co., Westerville, O.  
LaPlant-Choate Mfg. Co., Cedar Rapids, Iowa  
John Waldron Corp., New Brunswick, N. J.

## SUBGRADING MACHINES

\*Koehring Co., Milwaukee  
\*Lakewood Eng. Co., Cleveland, O.  
The Hug Co., Highland, Ill.  
Shaw-Epochs Tractor Co., Minneapolis

## SUPERHEATERS

Babcock & Wilcox Co., New York  
Power Specialty Co., New York  
Superheater Co., New York

## SURVEYORS' INSTRUMENTS (See Instruments)

## SWITCHBOARDS

Allis-Chalmers Mfg. Co., Milwaukee  
General Electric Co., Schenectady, N. Y.  
Wagner Electric Mfg. Co., St. Louis, Mo.  
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

## TOWERS (See Standpipes and Elevated Tanks)

## TAMPING MACHINES

\*Cement Block Machinery Co., Newark, N. J.  
\*Independent Pneumatic Tool Co., Chicago  
Abrams Cement Tool Co., Detroit  
Chicago Pneumatic Tool Co., New York  
Harnischfeger Corp., Milwaukee, Wis.  
Ingersoll-Rand Co., New York

## TANKS, AIR COMPRESSOR

\*Gomery & Co., Inc., Philadelphia  
\*Curtis Engr. Mch. Co., St. Louis, Mo.  
\*Heli Co., Milwaukee, Wis.  
Biggs Boiler Works, Akron, Ohio  
Birmingham Tank Co., Birmingham, Ala.  
Chicago Bridge & Iron Works, Chicago  
Chicago Pneumatic Tool Co., New York  
Graver Corp., East Chicago, Ill.  
Indiana Air Pump Co., Indianapolis  
Ingersoll-Rand Co., New York  
Lancaster Iron Works, Lancaster, Pa.  
Littleford Bros., Cincinnati, Ohio  
Nagle Engine & Boiler Works, Erie, Pa.  
National Tube Co., Pittsburgh, Pa.  
Petroleum Iron Works Co., Sharon, Pa.  
Pittsburgh-Des Moines Steel Co., Pittsburgh, Pa.  
W. B. Scaife & Sons, Pittsburgh, Pa.  
Westinghouse Tract. Brake Co., Wilmerding, Pa.  
Worthington Pump & Mch. Co., New York

## TANKS, STEEL

\*Gomery & Co., Philadelphia  
\*Heli Co., Milwaukee, Wis.  
\*Joseph Honhorst Co., Cincinnati, Ohio  
Bausman Mfg. Co., Millersville, Pa.  
Biggs Boiler Works, Akron, Ohio  
Birmingham Tank Co., Birmingham, Ala.  
S. F. Bowser & Co., Inc., Ft. Wayne, Ind.  
J. I. Case Threshing Machine Co., Racine, Wis.  
W. E. Caldwell Co., Louisville, Ky.  
Canton Art Metal Co., Canton, O.  
Chattanooga Boiler & Tank Co., Chattanooga, Tenn.  
Chicago Bridge & Iron Works, Chicago  
Columbian St. Tank Co., Kansas City, Mo.  
Dover Boiler Works, New York  
Farrell Mfg. Co., Joliet, Ill.  
O. C. Fouts Co., Middletown, O.  
Graver Corp., E. Chicago, Ind.

R. Hardesty Mfg. Co., Denver, Col.  
Hendrick Mfg. Co., Carbondale, Pa.  
Lancaster Iron Works, Lancaster, Pa.  
Littleford Bros., Cincinnati, Ohio  
Nagle Eng. & Boiler Works, Erie, Pa.  
New York Central Iron Works Co., Hagerstown, Md.  
Pacific Tank & Pipe Co., San Francisco  
Petroleum Iron Works Co., Sharon, Pa.  
Pittsburgh-Des Moines Steel Co., Pittsburgh, Pa.  
Ritter-Conley Co., Pittsburgh, Pa.  
W. B. Scaife & Sons, Pittsburgh  
United Iron Works, Inc., Kansas City, Mo.  
Walsh & Weldner Boiler Co., Chattanooga, Tenn.

## TANKS, WOOD

W. E. Caldwell Co., Louisville, Ky.  
G. M. Davis & Son, Palatka, Fla.  
Eagle Tank Co., Chicago  
Hanser-Stander Tank Co., Cincinnati, Ohio  
Kalamazoo Tank & Silo Co., Kalamazoo, Mich.  
National Tank & Pipe Co., Portland, Ore.  
Pacific Tank & Pipe Co., San Francisco  
Redwood Mfrs. Co., San Francisco  
A. T. Stearns Lumber Co., Boston  
U. S. Wind Eng. & Pump Co., Batavia, Ill.  
Wendnagel & Co., Chicago.

## TANK WAGONS

\*Acme Road Machinery Co., Frankfort, N. Y.  
\*Heli Co., Milwaukee, Wis.  
\*Joseph Honhorst Co., Cincinnati, O.  
\*Mack Trucks, Inc., New York  
Butler Mfg. Co., Minneapolis, Minn.  
J. I. Case Threshing Machine Co., Racine.  
Gallon Iron Works & Mfg. Co., Gallon, Ohio

## TAPES, STEEL AND METALLIC

\*Lufkin Rule Co., Saginaw, Mich.  
Eugene Dietzgen Co., New York  
Keuffel & Esser Co., Hoboken, N. J.  
The L. S. Starrett Co., Athol, Mass.

## TAR

\*Barrett Co., New York  
American Tar Products Co., Pittsburgh, Pa.

## TARPAULINS, WATERPROOF

Hoosier Tarpaulin & Canvas Goods Co., Indianapolis, Ind.

## TAR KETTLES (See Kettles)

## THAWING OUTFITS

\*Aerol Burner Co., West New York, N. J.  
Littleford Bros., Cincinnati  
Hauck Mfg. Co., Brooklyn, N. Y.

## TIE TAMPERS

Electric Tamper & Equipment Co., Chicago

## TIE BOLTS FOR WALL FORMS

\*M. & M. Wire Clamp Co., Minneapolis  
Hawley Mfg. Co., Chicago, Ill.

## TIES, STEEL

Carnegie Steel Co., Pittsburgh, Pa.  
International Steel Tie Co., Cleveland, O.  
Koppel Ind. Car & Equipment Co., Koppel, Pa.  
Sweet's Steel Co., Williamsport, Pa.

## TIMBER CLAMPS

M. & M. Wire Clamp Co., Minneapolis  
Pyle-Rogers Corp., New York

## TIRES, RUBBER (For Motor Trucks)

Firestone Tire & Rubber Co., Akron, O.  
Fisk Tire Co., Chicopee Falls, Mass.  
Goodrich Rubber Co., Akron, O.  
Goodyear Tire & Rubber Co., Akron, O.  
Kelly Springfield Tire Co., New York  
U. S. Tire Co., New York

## TOOL HOUSE, PORTABLE STEEL

\*Blaw-Knox Co., Pittsburgh, Pa.  
Littleford Bros., Cincinnati, Ohio

## TORCHES, OIL HEATING

\*Alex Milburn Co., Baltimore, Md.  
Chausse Oil Burner Co., Elkhart, Ind.  
Hauck Mfg. Co., Brooklyn, N. Y.  
Hoosier Paint Works, Ft. Wayne, Ind.  
Littleford Bros., Cincinnati  
Mead-Morrison Mfg. Co., East Boston, Mass.  
Sewall Paint & Varnish Co., Kansas City, Mo.  
Sherwin-Williams Co., Cleveland, O.  
Tropical Paint & Oil Co., Cleveland, O.  
Truscon Laboratories, Detroit, Mich.

## TORCHES, WELDING

\*McCloskey Torch Co., Toledo, Ohio  
Toledo Pressed Steel Co., Toledo, Ohio

## TRACKS, INDUSTRIAL AND PORTABLE

\*Lakewood Eng. Co., Cleveland, O.  
Atlas Car & Mfg. Co., Cleveland, O.  
Bethlehem Steel Co., Bethlehem, Pa.  
Chase Foundry & Mfg. Co., Columbus, O.  
Easton Car & Construction Co., Easton, Pa.  
C. W. Hunt Co., Inc., W. N. Brighton, N. Y.  
Koppel Ind. Car & Equipment Co., Koppel, Pa.  
Sweet's Steel Co., Williamsport, Pa.

## TRACTION TREADS (See Treads, Traction)

## TRACTORS

\*Caterpillar Tractor Co., San Leandro, Calif.  
\*Cleveland Tractor Co., Cleveland, O.  
\*Huber Mfg. Co., Marion, O.  
\*International Harvester Co., Chicago  
\*John Lauson Co., New Holstein, Wis.  
\*Mack Trucks, Inc., N. Y.  
\*Monarch Tractors Corp., Springfield, Ill.  
\*Rogers Bros., Corp., Albion, Pa.  
Advance-Rumley Thresher Co., Laporte, Ind.  
Allis-Chalmers Mfg. Co., Milwaukee  
Bates Mfg. Co., Joliet, Ill.  
J. I. Case Threshing Co., Racine, Wis.  
Clark Tractor Co., Battle Creek, Mich.  
Electric Wheel Co., Quincy, Ill.  
Emerson-Brantingham, Rockford, Ill.  
Ford Motor Co., Detroit, Mich.  
Geo. Hais Mfg. Co., N. Y.  
Hart-Parr Co., Charles City, Ia.  
J. T. Tractor Co., Cleveland, O.  
Kinnard & Haines, Minneapolis, Minn.  
Lombard Tractor & Truck Corporation, N. Y.  
Mead-Morrison Mfg. Co., E. Boston  
Minneapolis Steel & Mach. Co., Minneapolis  
Shaw-Epochs Tractor Co., Minneapolis, Wis.  
Wehr Co., Milwaukee.

## TRACTOR ACCESSORIES

\*Whitehead & Kales Co., Detroit.  
Pickering Governor Co., Portland, Conn.  
Trail-IT Co., St. Paul, Minn.

## TRACTOR HITCHES

\*Whitehead & Kales Co., Detroit  
Trail-IT Co., St. Paul, Minn.

## TRAFFIC LINE MARKING MACHINES

Carrara Paint Co., Cleveland, O.  
Continental Prod. Co., Euclid, O.  
Line-O-Graph Co., N. Y.  
Littleford Bros., Cincinnati, Ohio  
Tennessee Tool Works, Inc., Knoxville, Tenn.

## TRAFFIC PAINT

J. E. Bauer Co., Los Angeles, Cal.  
Continental Prod. Co., Euclid, O.  
Hanline Bros., Baltimore, Md.

## TRAFFIC PLATES

Allan Wood Iron & Steel Co., Philadelphia.  
American Pressed Steel Co., Philadelphia.  
Central Iron & Steel Co., Harrisburg, Pa.

## TRAFFIC SIGNAL EQUIPMENT

Acme Traffic Signal Co., Los Angeles  
Alumond Sign & Signal Co., Chicago  
Amer. Gas Accumulator Co., Elizabeth, N. J.  
Auto Sign Display Co. of Mo., St. Louis, Mo.  
Gretney Traffic Guide Co., Madison, Wis.  
Crouse-Hinds Co., Syracuse, N. Y.  
Esco Mfg. Co., Peoria, Ill.  
Evernu-Century Sign Co., Boston.  
Griswold Safety Signal Co., Minneapolis.  
Harrington-Seaberg Corporation, Moline, Ill.  
Horn Signal Mfg. Corporation, Newark, N. J.  
Line Material Co., South Milwaukee, Wis.  
Little Giant Co., Menkato, Minn.  
Lylo-Signs, Minneapolis, Minn.  
Ohio Traffic Devices Co., Columbus, O.  
Rochester Street Signal Co., Rochester, N. Y.  
Tolheim Oil Tank & Pump Co., Ft. Wayne, Ind.  
Union Iron Prod. Co., E. Chicago, Ind.  
Universal Traffic Control Co., Oklahoma City, Okla.  
Welsbach Traffic Signal Co., Philadelphia.

## TRAILERS FOR TRUCKS AND TRACTORS

\*Highway Trailer Co., Edgerton, Wis.  
\*Miami Trailer-Scraper Co., Troy, O.  
\*Rogers Bros. Corporation, Albion, Pa.  
\*Gustav Schaefer Wagon Co., Cleveland.  
\*Whitehead & Kales Co., Detroit, Mich.  
Arcadia Trailer Corporation, Newark, N. J.  
Detroit Trailer & Mach. Co., Detroit.  
Eagle Wagon Works, Auburn, N. Y.  
Easton Car & Construction Co., Easton, Pa.  
Electric Wheel Co., Quincy, Ill.  
Fruehauf-Trailer Co., Detroit, Mich.  
Hercules Trailer Mfg. Co., Los Angeles.  
Imperial Mach. Co., Minneapolis.  
LaPlant-Choate Mfg. Co., Cedar Rapids, Iowa  
Lee Trailer & Body Co., Chicago.  
Little Red Wagon Mfg. Co., Omaha.  
Rex-Watson Corporation, Canastota, N. Y.  
Trail-Ford Co., Ann Arbor, Mich.  
Trailmobile Co., Cincinnati.  
Troy Trailer & Wagon Co., Troy, O.  
Warner Mfg. Co., Beloit, Wis.

## TRAILERS, HEAVY MACHINERY

\*Highway Trailer Co., Edgerton, Wis.  
\*Rogers Bros., Corporation, Albion, Pa.

## TRAILERS, INDUSTRIAL

\*Highway Trailer Co., Edgerton, Wis.  
\*Lakewood Eng. Co., Cleveland, O.  
\*Miami Trailer-Scraper Co., Troy, O.  
\*Rogers Bros. Corp., Albion, Pa.  
\*Gustav Schaefer Wagon Co., Cleveland

\* Indicates that the manufacturer carries an advertisement. See index facing inside back cover.\*

# The Curtis costs less than other portables



## Three Savings:

1. **SAVES LABOR.** No non-productive attendant. No taking of men off their work to move the compressor. No stoppage to extend air lines; long line losses eliminated. The Curtis unit does the work of 6 to 8 men at a daily operating cost equivalent to one man's wage.
2. **SAVES FUEL.** One engine instead of two. An economical power plant. Burns kerosene successfully at a great saving of fuel cost.
3. **SAVES INVESTMENT.** Curtis unit and Fordson together cost less than other portable units of equal capacity. If you have Fordson, new investment again practically cut in half.

## Yet what more can any compressor do for you at any price?

Your cost of compressed air on any job is made up of two items: (a) compressing the air into the receiver, and (b) delivering it at full pressure to the tools. The Curtis unit will make great savings for you on both items.

The Fordson engine both moves and operates the compressor, reducing your machinery investment. Fuel cost is considerably decreased. The instant mobility of the Curtis, avoiding long, wasteful air-lines, results in obvious economies.

No special attendant is required as the compressor can always be kept within hose length of the work. Operation is practically automatic. Any tool operator can move the outfit as required, with no loss of time and without the necessity of an extra man on the payroll.

The economies of this unit are great and will prove themselves to you upon investigation. Mail the coupon and let us send you full details.



**Curtis**  
Pneumatic Machinery Company  
St. Louis  
Seventy-fourth Year

1931 Kienlen Ave., St. Louis

518-I Hudson Terminal, New York

Do you mention the CONTRACTORS AND ENGINEERS MONTHLY when writing? Please do.

Gentlemen:—Please send me full details on the Curtis Portable Compressor, your proposition and prices.

Name .....

Address .....

..... Do you use a Fordson? .....

Check items in which interested



# Where to Purchase

**\*Whitehead & Kales Co.,** Detroit, Mich.  
**Chase Fdry. & Mfg. Co.,** Columbus, O.  
**Clark Tractor Co.,** Battle Creek, Mich.  
**Detroit Trailer & Machinery Co.,** Detroit.  
**Easton Car & Construction Co.,** Easton, Pa.  
**Electric Wheel Co.,** Quincy, Ill.  
**LaPlant-Chaste Mfg. Co.,** Cedar Rapids, Iowa  
**Lee Trailer & Body Co.,** Plymouth, Ind.  
**Trailmobile Co.,** Cincinnati.

**TRAILER COUPLINGS**  
 Trail-IT Co., St. Paul, Minn.

**TRAMWAYS, AERIAL WIRE ROPE**  
 (See Aerial Wire Rope Tramways)

**TRANSFORMERS**  
**Allis-Chalmers Mfg. Co.,** Milwaukee.  
**Duncan Elec. Mfg. Co.,** Lafayette, Ind.  
**Enterprise Elec. Co.,** Warren, O.  
**General Elec. Co.,** Schenectady, N. Y.  
**Kuhlman Elec. Co.,** Bay City, Mich.  
**Maloney Electric Co.,** St. Louis, Mo.  
**Packard Electric Co.,** Warren, O.  
**Pittsburgh Transf. Co.,** Pittsburgh, Pa.  
**Wagner Elec. Corp.,** St. Louis, Mo.  
**Westinghouse Elec. & Mfg. Co.,** E. Pittsburgh, Pa.

**TRANSITS AND LEVELS** (See Instruments)

**TRANSMISSIONS (Auxiliary & Replacement)**  
**\*Waukesha Motor Co.,** Waukesha, Wis.  
**Fuller & Sons Mfg. Co.,** Kalamazoo, Mich.  
**Hinkley Motors, Inc.,** Detroit.  
**Lincoln Mfg. Co.,** Connersville, Ind.  
**Muncie Gear Wks.,** Muncie, Ind.  
**Ruckstell Sales & Mfg. Co.,** N. Y.  
**Warford Corporation, N. Y.**

**TRANSMISSIONS FOR TRUCK MOTORS**  
 (1 to 7 Tons)  
**Fuller & Sons Mfg. Co.,** Kalamazoo, Mich.

**TRANSMISSION MACHINERY, POWER**  
**\*Link-Belt Co.,** Chicago  
**Allis-Chalmers Mfg. Co.,** Milwaukee.  
**Chain Belt Co.,** Milwaukee, Wis.  
**Dodge Mfg. Corp.,** Mishawaka, Ind.  
**Kent Machine Co.,** Kent, O.  
**Webster Mfg. Co.,** Chicago  
**Weller Mfg. Co.,** Chicago

**TRASH CANS** (See Cans)

**TRAVELING WATER SCREENS**  
**Chain Belt Co.,** Milwaukee, Wis.

**TREADS, SAFETY**  
**\*Blaw-Knox Company,** Pittsburgh, Pa.  
**American Abrasive Metals Co.,** N. Y.  
**American Mason Safety Tread Co.,** Lowell, Mass.  
**Concrete Steel Co.,** N. Y.  
**Norton Co.,** Worcester, Mass.

**TREADS, TRACTION**  
**\*Caterpillar Tractor Co.,** San Leandro, Cal.  
**\*Trackson Co.,** Milwaukee  
**\*Whitehead & Kales Co.,** Detroit  
**Belle City Mfg. Co.,** Racine, Wis.  
**Electric Wheel Co.,** Quincy, Ill.  
**Tractor Grip Wheel Co.,** Toledo, O.

**TRENCH EXCAVATOR** (See Excavators)

**TRENCH PUMPS** (See Pumps, Contractors')

**TURBINES**  
**Allis-Chalmers Mfg. Co.,** Milwaukee  
**De Laval Steam Turbine Co.,** Trenton, N. J.  
**General Electric Co.,** Schenectady, N. Y.  
**Ingersoll-Rand Co.,** N. Y.  
**Terry Steam Turbine Co.,** Hartford, Conn.  
**Westinghouse Electric & Mfg. Co.,** E. Pittsburgh, Pa.

**TURNTABLES FOR MOTOR TRUCKS**  
**\*Blaw-Knox Co.,** Pittsburgh, Pa.  
**Champion Engine Co.,** Kenton, O.  
**Easton Car & Construction Co.,** Easton, Pa.  
**Freeman Mfg. Co.,** Racine, Wis.  
**Hog Co.,** Highland, Ill.  
**Western Structural Co.,** Moline, Ill.

**VALVES, ACID RESISTING**  
**Barber Asphalt Co.,** Philadelphia

**VALVES, CHECK**  
**Chapman Valve Mfg. Co.,** Indian Orchard, Mass.  
**Coffin Valve Co.,** Boston  
**Ludlow Valve Mfg. Co.,** Troy, N. Y.  
**Mich. Valve & Foundry Co.,** Detroit  
**Rensselaer Valve Co.,** Troy, N. Y.

**VALVES, GATE AND INDICATOR POSTS**  
**Chapman Valve Mfg. Co.,** Indian Orchard, Mass.  
**Coffin Valve Co.,** Boston  
**Columbian Iron Works, Chattanooga, Tenn.**  
**Crane Company, Chicago**  
**Darling Valve & Mfg. Co.,** Williamsport, Pa.  
**Eddy Valve Co.,** Waterford, N. Y.  
**Fairbanks Co.,** N. Y.  
**Iowa Valve Co.,** Oskaloosa, Ia.  
**Kennedy Valve Mfg. Co.,** Elmira, N. Y.  
**Ludlow Valve Mfg. Co.,** Troy, N. Y.  
**Rensselaer Valve Co.,** Troy, N. Y.  
**A. P. Smith Mfg. Co.,** E. Orange, N. J.  
**Waterous Co.,** St. Paul  
**R. D. Wood & Co.,** Philadelphia

**VALVES, PRESSURE SEATED**  
**Cleveland Pneumatic Tool Co.,** Cleveland, Ohio

**VALVES, RELIEF**  
**\*Neptune Meter Co.,** New York

**VALVES, TAPPING**  
**Eddy Valve Co.,** Waterford, N. Y.  
**Hays Mfg. Co.,** Erie, Pa.  
**Kennedy Valve Mfg. Co.,** Elmira, N. Y.  
**Ludlow Valve Co.,** Troy, N. Y.  
**Michigan Valve & Foundry Co.,** Detroit  
**Rensselaer Valve Co.,** Troy, N. Y.  
**Waterous Co.,** St. Paul  
**A. P. Smith Mfg. Co.,** E. Orange, N. J.

**VALVE BOXES AND HOUSINGS**  
**\*Central Foundry Co.,** N. Y.  
**Chapman Valve Mfg. Co.,** Indian Orchard, Mass.  
**H. W. Clark Co.,** Mattoon, Ill.  
**J. B. Clow & Sons, Chicago**  
**Columbian Iron Works, Chattanooga, Tenn.**  
**Darling Valve & Mfg. Co.,** Williamsport, Pa.  
**Eddy Valve Co.,** Waterford, N. Y.  
**Iowa Valve Co.,** Oskaloosa, Ia.  
**Kennedy Valve Mfg. Co.,** Elmira, N. Y.  
**Ludlow Valve Mfg. Co.,** Troy, N. Y.  
**Mueller Co.,** Decatur, Ill.  
**Van Rensselaer Valve Co.,** Troy, N. Y.  
**A. P. Smith Mfg. Co.,** E. Orange, N. J.  
**Waterous Co.,** St. Paul  
**R. D. Wood & Co.,** Philadelphia

**WAGONS** (See Dump Carts and Wagons)

**WAGON BODIES** (See Dump Bodies)

**WAGON LOADERS** (See Loaders, Gravel)

**WALLBOARD**  
**Beaver Prod. Co., Inc.,** Buffalo, N. Y.  
**Bird & Son, Inc.,** E. Walpole, Mass.  
**Celotex Co.,** Chicago  
**Cornell Wood Prod. Co.,** Chicago  
**Haverhill Box Board Co.,** Haverhill, Mass.  
**MacAndrews & Forbes Co.,** N. Y.  
**Plasteron Wall Board Co.,** Buffalo, N. Y.  
**U. S. Gypsum Co.,** Chicago  
**Upson Co.,** Lockport, N. Y.  
**Waldorf Paper Prod. Co.,** St. Paul, Minn.

**WALL TIES**  
**\*M. & M. Wire Clamp Co.,** Minneapolis  
**Berger Mfg. Co.,** Canton, O.  
**Concrete Steel Co.,** N. Y.  
**Consolidated Exp. Metal Co.,** Wheeling, W. Va.  
**Hawley Mfg. Co.,** Chicago  
**Milwaukee Corr. Co.,** Milwaukee, Wis.  
**Niagara Metal Stamp. Corp.,** Niagara Falls, N. Y.

**WASHERS, SAND AND GRAVEL**  
**\*Link-Belt Co.,** Chicago  
**Allis-Chalmers Mfg. Co.,** Milwaukee  
**Jeffrey Mfg. Co.,** Columbus, O.  
**Smith Engineering Works, Milwaukee**  
**Stephens-Adamson Mfg. Co.,** Aurora, Ill.

**WATER MAIN CLEANING**  
**National Water Main Cleaning Co.,** N. Y.

**WATER MAIN TAPPING MACHINES**  
**Hays Mfg. Co.,** Erie, Pa.  
**Mueller Co.,** Decatur, Ill.  
**A. P. Smith Mfg. Co.,** E. Orange, N. J.

**WATER METERS** (See Meters, Water)

**WATERPROOFING COMPOUNDS AND MATERIAL**  
**\*Barrett Company, N. Y.**  
**\*Philip Carey Co.,** Cincinnati, O.  
**\*Standard Oil Co. (Indiana),** Chicago  
**Anti-Hydro Waterproofing Co.,** Newark, N. J.  
**Atlantic Refining & Asphalt Corp.,** Philadelphia  
**Barber Asphalt Co.,** Philadelphia, Pa.  
**Euclid Chemical Co.,** Cleveland  
**Genfire Steel Co.,** Youngstown, O.  
**Master Builders' Co.,** Cleveland, O.  
**Minwax Co.,** N. Y.

**Ruberoid Co.,** N. Y.  
**Sandusky Cement Co.,** Cleveland, O.  
**Sonneborn Sons, Inc.,** N. Y.  
**Texas Company, N. Y.**  
**Toch Brothers, N. Y.**  
**Trascon Laboratories, Detroit, Mich.**

**WATER PURIFICATION** (See also Filters)  
**\*Wallace & Tiernan Co., Inc.,** Newark, N. J.  
**Cochrane Corp.,** Philadelphia  
**Paradon Eng. Co.,** Arlington, N. J.  
**R. U. V. Co.,** N. Y.

**WATER PURIFICATION CHEMICALS**  
**Arnold Hoffman & Co., Inc.,** N. Y.  
**E. I. Du Pont de Nemours & Co.,** Wilmington, Del.  
**Electro Bleaching Gas Co.,** N. Y.  
**General Chemical Co.,** N. Y.  
**Hooker Electrochemical Co.,** N. Y.  
**Mathieson Alkali Works, Inc.,** N. Y.  
**Pennsylvania Salt Mfg. Co.,** Philadelphia

**WATER SOFTENERS**  
**American Water Softener Co.,** Philadelphia  
**Cochrane Corp.,** Philadelphia  
**Graver Corp.,** E. Chicago, Ind.  
**International Filter Co.,** Chicago  
**Permutit Co.,** N. Y.  
**W. B. Scaife & Sons, Pittsburgh, Pa.**  
**Wayne Tank & Pump Co.,** Ft. Wayne, Ind.

**WATER WASTE DETECTION**  
**Empire Electric & Water Co., Inc.,** N. Y.  
**Pitometer Co.,** N. Y.  
**Simplex Valve & Meter Co.,** Philadelphia

**WATER WHEELS**  
**Allis-Chalmers Mfg. Co.,** Milwaukee  
**Wm. Cramp & Sons, Ship & Eng. Bldg. Co.**  
 (I. P. Morris Dept.), Philadelphia  
**J. Laffel & Co.,** Springfield, O.  
**Newport News Shipbuilding & Dry Dock Co.,** Newport News, Va.  
**Pelton Water Wheel Co.,** San Francisco  
**S. Morgan Smith Co.,** York, Pa.  
**Worthington Pump & Machinery Corp.,** N. Y.

**WATER WORKS PUMPS** (See Pumps)

**WELDING APPARATUS**  
**\*Alex. Milburn Co.,** Baltimore, Md.  
**Burke Electric Co.,** Erie, Pa.  
**Carbic Mfg. Co.,** Duluth, Minn.  
**General Electric Co.,** Schenectady, N. Y.  
**Lincoln Electric Co.,** Cleveland, O.  
**Macleod Co.,** Cincinnati, O.  
**Oxweld Acetylene Co.,** L. I. City, N. Y.  
**Smith's Inventions, Inc.,** Minneapolis, Minn.  
**U. S. Light & Heat Corp.,** Niagara Falls  
**Westinghouse Electric & Mfg. Co.,** E. Pittsburgh, Pa.

**WELLS, CONCRETE**  
**Kelly Well Co.,** Grand Island, Neb.

**WELLS, GRAVEL WALL**  
**Layne & Bowler, Inc.,** Memphis, Tenn.

**WELL-DRILLING AND BLAST HOLE MACHINES**

**\*The Burch Corp.,** Crestline, Ohio  
**\*Keystone Driller Co.,** Beaver Falls, Pa.  
**\*Star Drilling Machine Co.,** Akron, O.  
**Armstrong Mfg. Co.,** Waterloo, Ia.  
**Burkhardt Co.,** Kiel, Wis.  
**Loomis Machine Co.,** Lima, O.  
**Sanderson Cyclone Drill Co.,** Orrville, O.

**WELL SCREENS**  
**A. D. Cook, Inc.,** Lawrenceburg, Ind.  
**E. E. Johnson, Inc.,** St. Paul, Minn.

**WHEELBARROWS**  
**\*General Wheelbarrow Co.,** Cleveland, O.  
**\*Lansing Co.,** Lansing, Mich.  
**\*Sterling Wheelbarrow Co.,** Milwaukee  
**\*Toledo Wheelbarrow Co.,** Toledo, O.  
**Asheboro Wheelbarrow Co.,** Asheboro, N. Carolina  
**Chattanooga Wheelbarrow Co.,** Chattanooga, Tenn.  
**Cleveland Wheelbarrow Co.,** Cleveland, O.  
**Fairbanks Co.,** N. Y.  
**Jackson Mfg. Co.,** Harrisburg, Pa.  
**Puffer-Hubbard Mfg. Co.,** Minneapolis  
**Sidney Steel Scraper Co.,** Sidney, O.

**WHEELS GRIDIRON GRIP**  
**\*Whitehead & Kales Co.,** Detroit, Mich.

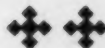
**WINCHES**  
**\*Beebe Bros., Inc.,** Seattle, Wash.  
**\*Clyde Iron Works Sales Co.,** Duluth, Minn.  
**\*Dake Eng. Co.,** Grand Haven, Mich.  
**\*Dobbie Foundry & Mach. Co.,** Niagara Falls  
**\*Ersted Mfg. Co.,** Portland, Ore.

ACCEPT NO SUBSTITUTE

# Sterling

**"10-spoke" wheel with a smooth tread gives greater strength, rigidity and service**

No part of a barrow receives as hard abuse as does the wheel—bumped over rocks, jammed against walls, charging, hoppers—sharp twists and turns with a full load. To withstand this severe usage Sterling found that the ordinary barrow wheel was not strong enough. In the Sterling wheel you will find a specially engineered idea. The wheel has "10 spokes" instead of the usual 8. The spokes are riveted and shouldered to the tire and cast to a wrought steel hub. The wheel is equipped with self-lubricating bearings, no oil service ever needed. The wheel and bearings revolve on a round, cold rolled steel shaft, not an ordinary bolt, which is keyed in a stationary position, by means of split pins, to malleable iron brackets—can't bind.



## SPECIAL STERLING FEATURES

Self-lubricating bearings	Selected maple handles
10-spoke wheel	Special tubular steel handles
Malleable iron brackets	Handles clamped—not bolted
Smooth wheel face	Top of tray reinforced
Wrought steel hub	Channel steel legs
Riveted and cast to hub spokes	Riveted leg braces
Fixed rolled steel axle	Extra leg shoes
"V" front tray braces	Wrought iron handle tips

All parts interchangeable



Compare this construction and you will quickly see why more contractors use Sterlings than any others. *Try them on your next job.*

*Buy by Sterling name—leading hardware and equipment dealers have them or they can get them quickly from our complete stock warehouses at Chicago, New York, Philadelphia, Pittsburgh, Cleveland, Detroit, St. Louis*

# STERLING WHEELBARRON COMPANY

STERLING ON A WHEELBARRON MEANS MORE THAN STERLING ON SILVER

Milwaukee

Wisconsin

## Where to Purchase

\*Idgerwood Mfg. Co., Elizabeth, N. J.  
 \*Mundy Sales Corp., N. Y.  
 \*Gustav Schafer Wagon Co., Cleveland  
 Advance-Rumley Thresher Co., La Porte, Ind.  
 Bethlehem Steel Co., Bethlehem, Pa.  
 Chisholm-Moore Mfg. Co., Cleveland, O.  
 John T. Horton Co., New York  
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 Mead-Morrison Mfg. Co., E. Boston  
 Street Bros. Mach. Works, Chattanooga

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 Detroit Steel Prod. Co., Detroit  
 E. D. Frederick Co., Holyoke, Mass.  
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 \*Williamsport Wire Rope Co., Williamsport, Pa.

American Cable Co., N. Y.  
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 Fischer & Hayes Rope & Steel Co., Chicago  
 General Electric Co., Schenectady, N. Y.  
 Habishaw Cable & Wire Corp., N. Y.  
 Hazard Insulated Wire Wks., Wilkesbarre, Pa.  
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 Marion Insulated Wire & Rubber Co., Chicago  
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 Simplex Wire & Cable Co., Boston  
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 Tubular Woven Fabric Co., Pawtucket, R. I.  
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Mississippi Wire Glass Co., N. Y.

### WIRE MESH REINFORCEMENT

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\*Truscon Steel Co., Youngstown, O.  
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### WIRE ROPE FITTINGS

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### WIRE ROPE (See Rope, Wire)

### WOOD BLOCKS (See Paving Blocks)

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Jaeger Portable Power Corp., Detroit

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 Protexol Corp., Kenilworth, N. J.  
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### WRENCHES

Snap-On Wrench Co., Chicago

## *For More than a Quarter of a Century Lakewood has Served the Construction Industry*

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FINISHING MACHINES  
 SUBGRADERS  
 CURB ROAD FORMS  
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CONCRETE MIXERS  
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NARROW GAUGE TRACK AND V-DUMP CARS

Write for Bulletin

**THE LAKEWOOD ENGINEERING CO.,**

**Cleveland, Ohio**

## **THE WORLD USES JOHNSTON BOILERS**



In the United States, in all the countries of Europe, in Africa, China, India,—wherever boilers are needed to speed the world's work, there you will find Johnston boilers on the job.

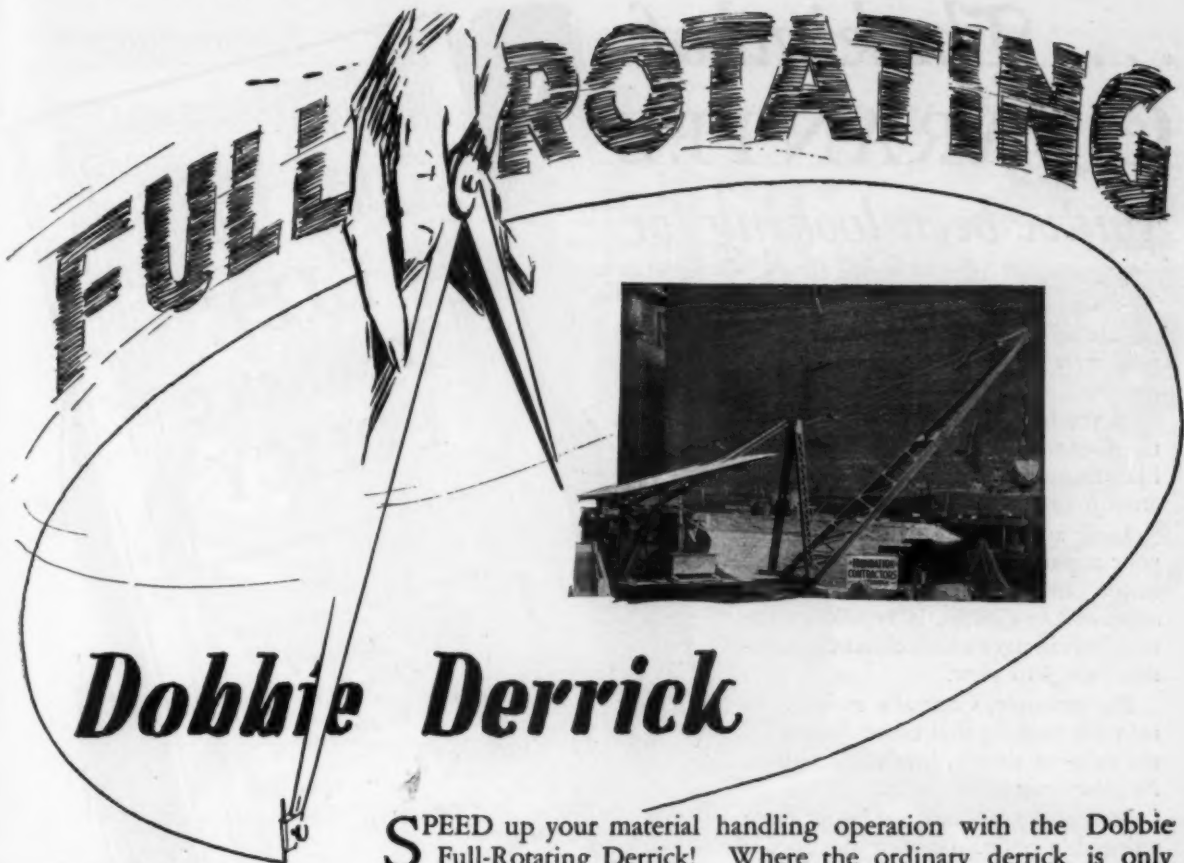
*Let us help you solve  
your boiler problems.*

## **JOHNSTON BROS., Inc.**

*Specializing in Boilers for Contractors' Equipment*

### **FERRYSBURG, MICHIGAN**





**TO EQUIPMENT  
DISTRIBUTORS**

Some Exclusive Sales  
Territories are now  
Available.

A Complete Stock of  
Hand Winches  
Sheaves  
Blocks

Wood Derrick Fittings

are carried in stock at

74 WARREN STREET  
NEW YORK CITY

**S**PEED up your material handling operation with the Dobbie Full-Rotating Derrick! Where the ordinary derrick is only good for 270 degrees, this new Dobbie machine keeps going right on around in either direction for a full circle! No time lost in back-tracking.

On a multitude of material handling jobs—for stock-piling, loading and unloading barges and cars, excavating—in fact wherever derricks are used at all, the Dobbie Full Rotating machine sets a new standard of efficiency.

In service, one of these full rotating machines has proven equal in working capacity to two derricks of the stiff-leg type. The latter type can swing only 270 degrees—then it has to go back.

This machine rotates on a single, circular rail track, on roller bearing equipped wheels. It is unusually fast—being capable of making 2.4 revolutions per minute.

Construction is of steel throughout. Operated by a Mundy 3-Speed Hoist, with either gasoline or electric power.

A folder fully describing this rotating derrick will be sent on request.

**The Mundy Sales Corporation**

Distributors for  
The Dobbie Foundry & Machine Co., Niagara Falls, N. Y.  
Sales and Export Office, - 30 Church Street, New York

**DOBBIE DERRICKS**  
Sheaves ~ ~ Hand Winches ~ ~ Blocks

# .... The kind of GUARANTEE you've been looking for

**I**T'S no accident that concrete buggies are being used more and more. They hold more material. They pour better concrete.

In the light of this growing interest, the General Concrete Cart for 1928 has aroused much favorable comment among contractors. Reasons? Certainly:

Look at that loop in front! Hitch your rope to it—don't punch a hole in the cart. And this obvious feature, *originated by General*, is typical of the many advantages which closer examination brings to view.

For example, General's *exclusive* removable bushing that takes all wear off the axle—a simple, invaluable feature. *No other concrete cart has it.*

Strength, too—plenty of it—at every vulnerable point. Balance that speeds up your work.

Yes, you'll get your full money's worth out of every General Concrete Cart you put on the job. And remember, like every General product, it's guaranteed to give you complete satisfaction according to *your* ideas. If any part breaks in service, it's replaced free.

*Mail the coupon for a folder fully describing the New General Concrete Buggy.*

## GENERAL WHEELBARROW COMPANY

Headquarters for Wheelbarrows,  
Concrete Carts, Steel Mortar Boxes,  
Scrapers, Salamanders  
3140 E. 65th St., Cleveland, Ohio

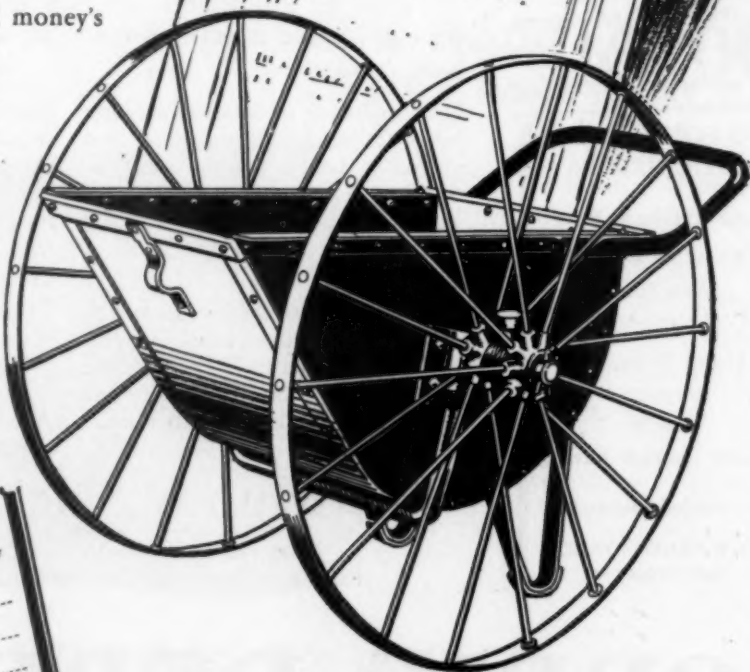
GENERAL WHEELBARROW CO.  
3140 E. 65th Street, Cleveland, Ohio  
Send full information about the New  
General Concrete Buggy.

Name .....

Company Name .....

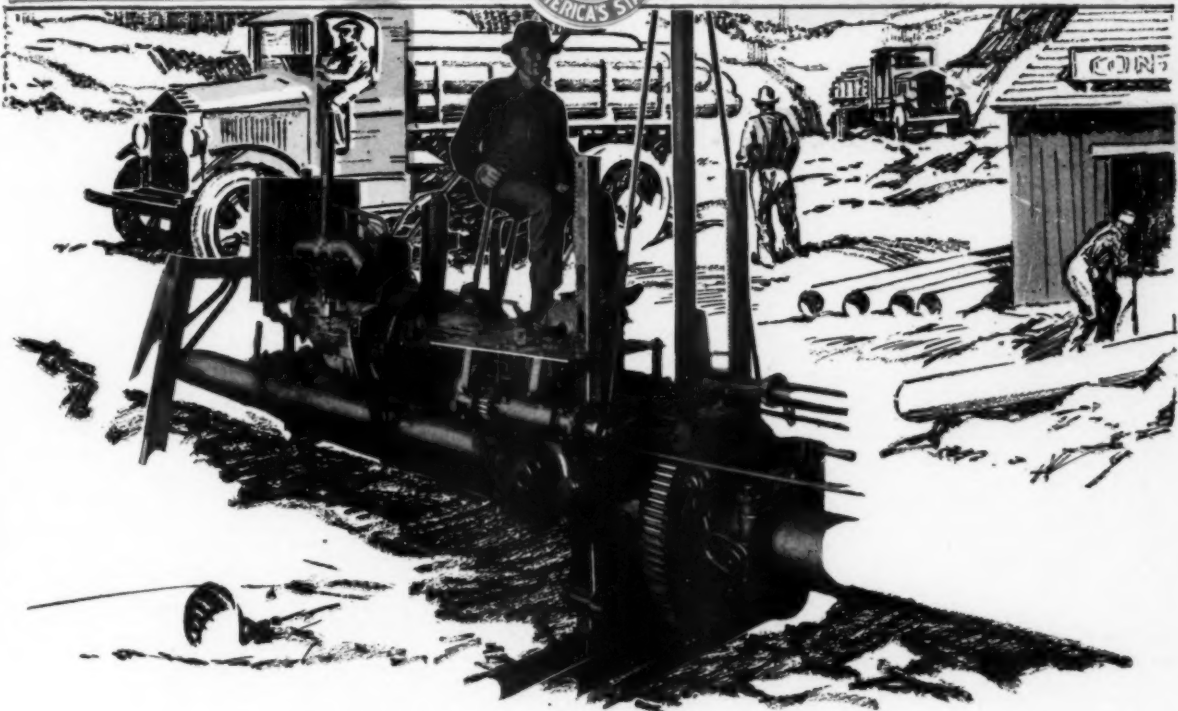
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City, State .....



**GENERAL  
AKRON**

# Dependable Power for Every Purpose

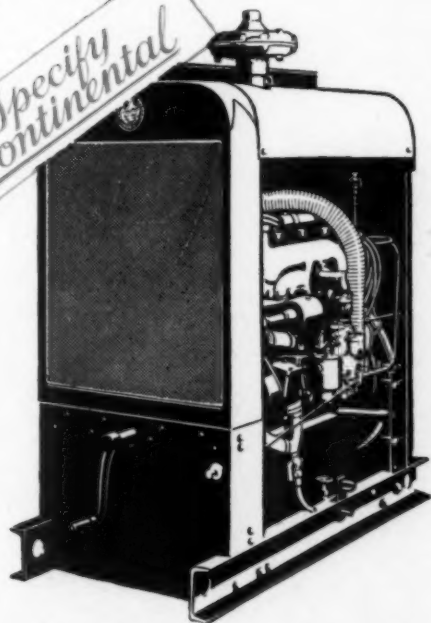


## Long Life— Less Expense

Cutting operating costs, getting more production out of the day's work, showing greater profits on the month's effort—users of Red Seal Continental motors are accomplishing these as well as securing many other advantages. And whether it be in mine or on railroad, in oil field or road building, there is a particular type of Red Seal Continental motor to do the work, quickly and economically.

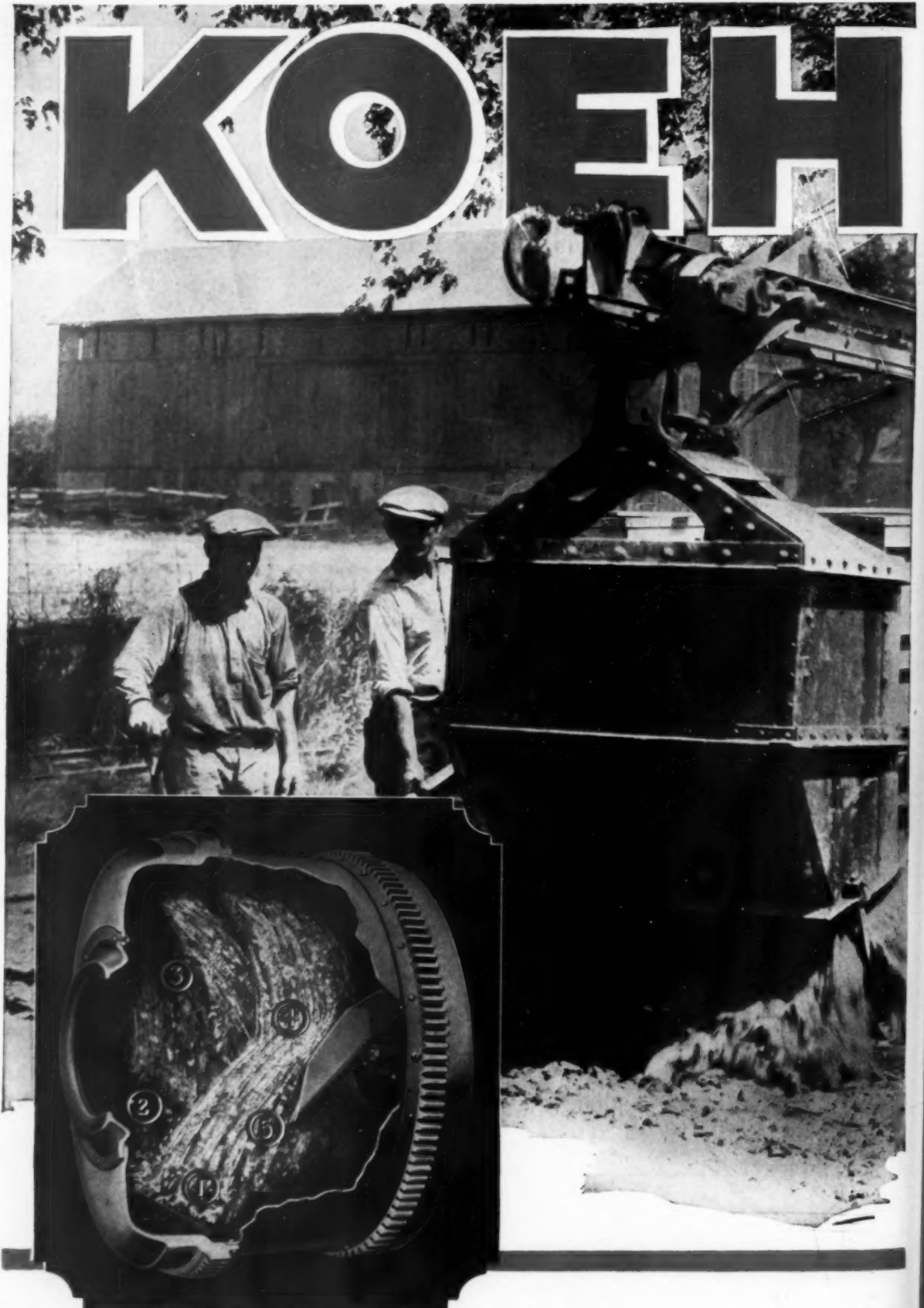
CONTINENTAL MOTORS CORPORATION  
INDUSTRIAL EQUIPMENT DIVISION  
Office and Factory: Muskegon, Michigan  
The Largest Exclusive Motor Manufacturer in the World

*Specify  
Continental*



# ***Continental Motors***







## Mixing Action No. 5

**T**HAT'S why the Koehring re-mixes concrete! After materials have gone all through the entire mixing process, action No. 5 returns them to the charging side of the drum for repeated trips through the mixing actions!

This is *only* possible because the Koehring discharge chute is pivoted well *inside* the drum.

Take a Koehring on the job without fear of batch tests for quality, or penalty of extended mixing period!

Koehring Dominant Strength concrete is your safety factor! Know the Koehring!

Write for Paver Catalog P-6

### SIZES

**Pavers** — 13-E, 27-E. Auxiliary equipment and choice of power to suit individual needs. Complies with A. G. C. Standards.

**Construction Mixers**—14-S, 21-S, 28-S. Steam, gasoline or electric power. Mounted on trucks or skids. Rubber tired wheels optional. 28-S on skids only. Complies with A. G. C. Standards.

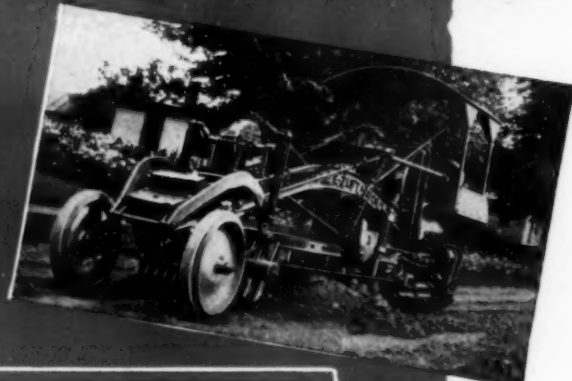
**Dandle Mixers**—5-S, 7-S, 10-S: — 5-S single cylinder, 7-S, 10-S two or four cylinder gasoline engine. Power charging skip, or low charging hopper and platform. Rubber tired steel disc wheels or steel rimmed wheels. Complies with A. G. C. Standards.

## KOEHRING COMPANY, MILWAUKEE, WISCONSIN

PAVERS, MIXERS—GASOLINE SHOVELS, CRANES AND DRAGLINES

Sales Offices and Service Warehouses in all principal cities  
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# Cletrac



## When Roads Need Repairing!

**S**UMMER traffic is again taking its annual toll from America's roads and highways. And again the work of maintenance becomes the all-important job.

This year, in greater numbers than ever before, CLETRAC Crawler Tractors are being swung into action—in large fleets and in single unit patrols. Theirs is the service of keeping roads and highways smooth and safe—and of making road appropriations go farther and last longer.

Wherever CLETRACS are used they seldom fail to establish new standards of *speed, power and low cost operation*. Built in a complete line—20, 30, 40 and the super-powered CLETRAC 100. Write for folders and complete information.

**The Cleveland Tractor Co., Cleveland, Ohio**





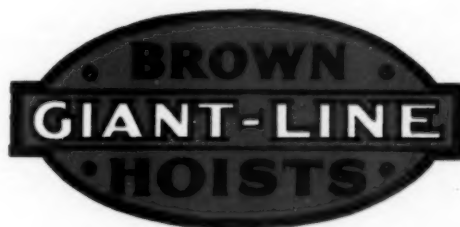
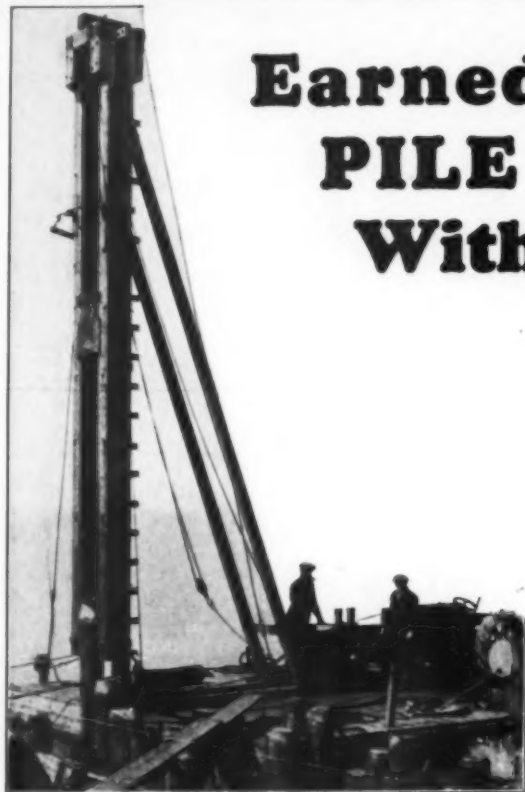
# CRAWLER TRACTORS



Please mention the CONTRACTORS AND ENGINEERS MONTHLY—it helps.

# Earned \$100 a Day PILE DRIVING With \$30 Expense

Gittens &amp; Hinkey, Contractors



**1500  
POUNDS  
CAPACITY**

**200  
FEET  
PER MINUTE**

FOUR-CYLINDER 12-HP. LE ROI

**H**OW long will it take you to make the Model 15-S pay for itself?

Equipped with four-cylinder 12-hp. Le Roi Power Unit, delivering 1500 pounds single-line pull at 200 feet per minute, this little Quality Hoist is ideally adapted to a wide range of applications.

Its high speed means time and money saved on elevator work, erection of steel and timbers, pile driving, stone setting, excavating, grading, etc.

Equipped with double-drum unit, which can be attached at any time, it is adaptable to light-duty dragline work, double elevator, material chute and any operations within its capacity.

The same standardized design is available in sizes ranging from 4 to 40 horsepower.

**General Hoist Catalog C, sent upon request.**

## DISTRIBUTORS

Cash in on this desirable business. A type and size adapted to every requirement. Some good protected territories still available. Our proposition provides for real Profit.

**The Brown Clutch Co.**  
Sandusky, Ohio, U. S. A.

HOIST SPECIALISTS SINCE 1905

Here it is—

# TRACKSON

McCORMICK-DEERING

Trackson Performance & International Reliability



Outstanding Performance, regardless of conditions, is characteristic of Trackson. McCormick-Deering's reliability is internationally recognized.

Combined—This time-tested equipment presents a Master Crawler Tractor embodying all the advantages of Trackson's sure-footed crawler traction and McCormick-Deering's power efficiency, simplicity of operation and flexibility. Truly—a Master Crawler Tractor!

Here is a heavy-duty Crawler unit of the size, power and weight adapted to almost universal demand—on road building and maintenance work, contracting, logging, farming oil fields and other industrial usage.

Ruggedness of construction and simplicity of design permit its use with almost every type of equipment for loading, digging, grading, ditching, heavy hauling, snaking, decking, etc.

Get complete facts on how this rugged resistless power, plus geared-to-the-earth traction, will assure you real results under all ground conditions. Write for folder DH.

**Trackson Company.**  
MAKERS OF FULL-CRAWLERS  
519 CLINTON ST. MILWAUKEE, WIS.



**5 Walls**  
**BATES**  
*Multi-Wall*  
**PAPER BAGS**

—no loss

**Cement Bags** that empty out clean

**T**ODAY, the saving way to use cement or plaster is to get it in Bates Multi-Wall Paper Bags. These modern containers empty out clean. The mixer receives every pound of material just as it left the mill, 100% usable and in perfect condition.

With their 5 separate walls of tough, impervious paper, Bates Bags

give reliable protection from rain, atmospheric moisture and rough handling. They eliminate dusting and reduce bag breakage to a minimum. And when they've done their work, they need not be returned for credit.

Buy the cement and plaster for your jobs in Bates Multi-Wall Paper Bags and avoid loss.

**BATES VALVE BAG CORPORATION**  
35 East Wacker Drive, Chicago, Illinois

**BATES** *Multi-Wall* **PAPER BAGS**

Bates Multi-Wall Paper Bags are made by the Bates Valve Bag Corporation in 8 modern plants throughout the country.

# EARTH HANDLING

## *Keeping Step with Progress*

Even to the cheapest known method of moving dirt, Austin-Western experience and resources have brought added economies. Since Civil war times, Austin-Western has developed elevating graders to meet practical working conditions. Now Austin-Western has replaced the horse-drawn wagon with a tractor-drawn crawler dump wagon of 7-yard capacity, revolutionizing this time-tested combination. This crawler dump wagon carries five times more dirt—and works with an elevating grader on the roughest going *like your left hand works with your right hand.*



Leaning Wheel Graders  
Straight Wheel Graders  
Motor Graders  
Elevating Graders  
Dump Wagons  
Crawler Dump Wagons  
Scarifiers  
Rock Crushers

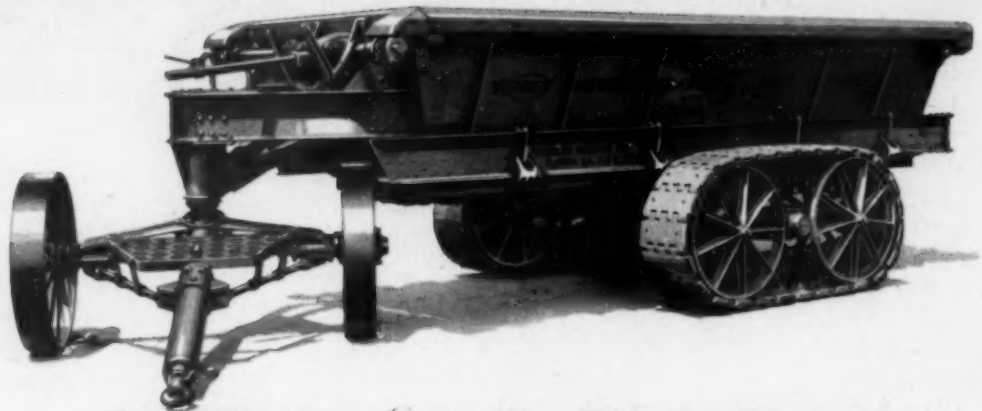
Portable Conveyors  
Motor Sweepers  
Street Sweepers  
Sprinklers  
Road Oilers  
Culverts  
Hot Patch Repair Outfits  
Plows and Scrapers

Crawler Wagon  
and  
Elevating Grader

## AUSTIN-WESTERN ROAD MACHINERY

"MOST MILES FOR YOUR ROAD DOLLARS"

# You get more mileage from this dollar saving combination



## *The Western Crawler Dump Wagon has revolutionized the earth handling industry*

Its sensational performance on whatever job it has been installed always calls forth enthusiastic praise and invariably brings repeat orders. It is designed to use to advantage the full power from, and to operate economically behind a crawler tractor.

Ninety per cent of its load is carried on broad Athey Truss Wheels. It can be pulled, heavily loaded, over soft ground, rough ground, or sand. Wherever a trac-

tor can lead, this wagon can follow.

Its enormous capacity saves the wages of four men, the upkeep of teams and the daily loss of time usually spent in maintaining smaller wagons. Government engineers rate the capacity of this all-steel wagon as equal to five 1½ yard dump wagons. Its capacity, and a speed of operation about twice that of a team of horses, makes it a great dollar saver on long hauls.

## Elevating Graders

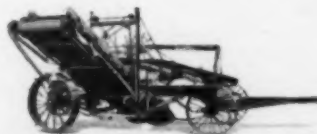
The Austin-Western Line of elevating graders, any one of which when operating with the Crawler Dump Wagon makes the cheapest known method of moving dirt, are shown below. The Austin

"New Era" operates behind the lighter tractors, while the Austin "Contractors Special" and the Western Elevating Grader are built for service behind the most powerful tractors.

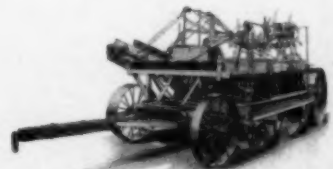
*The Austin  
"New Era"*



*The Austin  
"Contractor's Special"*



*The Western  
Elevating Grader*



The Austin-Western Road Machinery Co., Chicago, U. S. A.  
Dept. 1306 400 N. Michigan Ave.  
☐ Motor Graders ☐ Road Graders ☐ Snow Plows  
☐ Rollers ☐ Scarifiers ☐ Rock Crushers ☐ Oilers  
☐ Portable Conveyors ☐ Elevating Graders  
☐ Dump Wagons ☐ Street Sweepers ☐ Sprinklers  
☐ Hot-Patch Repair Outfits ☐ Plows and Scrapers  
Please send literature and full information on items checked.

Name.....

Address.....

## The Austin-Western Road Machinery Co.

400 North Michigan Avenue  
CHICAGO, ILLINOIS, U. S. A.

Branches in principal cities



# INSLEY MAST HOIST • CONCRETE PLACING MATERIAL HANDLING • EQUIPMENT

## Performing Better Than Was Expected

M. J. BOYLE & COMPANY, Chicago, have found, as have hundreds of other progressive builders, that when it comes to real economy and low costs in placing concrete, the Insley Mast Hoist cannot be beaten. Read what Mr. Boyle says about this Mast Hoist.

The Insley Mast Hoist handles concrete with the bucket and chutes. It also hoists all kinds of miscellaneous material with a material elevator, operating independent of the bucket. With a Chicago boom, it handles such material as reinforcing steel which is too long to be loaded on the elevator. Thus the Mast Hoist is three plants in one, capable of hoisting all material going into the job.

It is low in first cost, economical to erect, and is permanent equipment. Investigate it for that next job of yours.



M. J. BOYLE & COMPANY  
BUILDERS  
108 WEST MONROE STREET  
PHONE FRANKLIN 4325  
CHICAGO

April 10, 1929.

R. H. Ryland Co.,  
221 W. Huron St.,  
Chicago, Illinois.

Dear Sir:

Attention: Mr. Burlew.

We feel that it might be of interest to you to have our opinion upon the Insley Boom Chute Mast Hoist Plant, since we have for several years past been advocates of other types of towers.

We have placed the Insley 21 cu. ft. Mast Hoist Plant recently purchased from you on the new Austin Town Hall being erected for the West Chicago Park Commissioners. Starting with the footings we have poured the entire job with this Mast and we do not hesitate, at this time, to endorse the Insley Boom Chute Mast Hoist Plant as being able to perform in every way you claim. Our cost of placing concrete has been reduced even further than you claimed it would over previous costs using other equipment.

Furthermore, we are willing to go on record as a satisfied user of the Insley Mast Hoist equipment.

Very truly yours,

M. J. BOYLE & COMPANY  
BY *Malcolm J. Boyle*

MJB:K.

# INSLEY MANUFACTURING COMPANY - Indianapolis

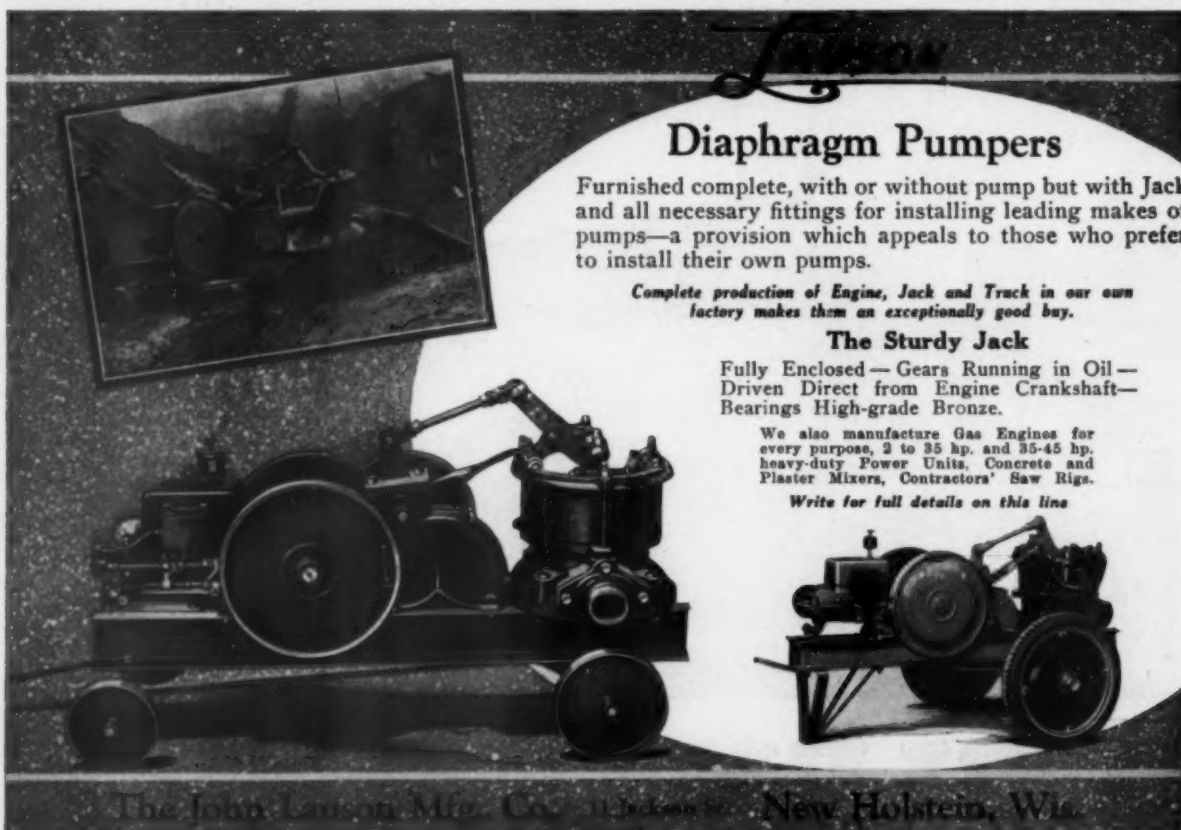
Engineers  
and  
Manufacturers

# BATES

# WIRE BAR TIES

**T**HE many building jobs on which Bates Wire Bar Ties and Tying Tools have been used show conclusively that this modern system of bar-tying doubles the production of the men and makes a better, stronger job. Every tie is tight and uniform. Skilled labor is not required. Write us for description, prices and name of nearest dealer.

BATES VALVE BAG CORPORATION 35 East Wacker Drive • Chicago



## Diaphragm Pumps

Furnished complete, with or without pump but with Jack and all necessary fittings for installing leading makes of pumps—a provision which appeals to those who prefer to install their own pumps.

*Complete production of Engine, Jack and Truck in our own factory makes them an exceptionally good buy.*

### The Sturdy Jack

Fully Enclosed—Gears Running in Oil—Driven Direct from Engine Crankshaft—Bearings High-grade Bronze.

We also manufacture Gas Engines for every purpose, 2 to 35 hp. and 35-45 hp. heavy-duty Power Units, Concrete and Plaster Mixers, Contractors' Saw Rigs.

*Write for full details on this line*

The John L. Lusk Mfg. Co. New Holstein, Wis.



# HOISTS CLYDE DERRICKS



Every proven device tending to safety and economy of operation is incorporated in Clyde-made Hoists.

*Picture—Funari & Behling, contractors, erecting steel for new Second Bank of Detroit building with Clyde 60 H. P. Gasoline Hoist.*

*You'll Take Pride  
In Your Clyde!*

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GUARANTEED QUALITY







## Now Wood Equipment (Power Operated) for Model A-A Ford Truck

The Wood Type G-1 Hydraulic Hi-Speed Hoist and Steel Dump Body mounted on the new Model A-A Ford Truck makes an ideal power-operated dumping unit, where speed is the prime essential.

The Wood G-1 Hoist dumps its load in 4 to 6 seconds. Mounting height is exceptionally low, and short overhang of body back of hinge provides for maximum ground clearance and allows free and speedy discharge of load.



J-1 Body Sides Removed and Tail Gate Lowered

Years of experience enable us to furnish the type of body which meets individual requirements best. For example: when the sides of the J-1 body are removed and the tailgate and tailgate post are hinged downward from the top it becomes a smooth platform (all-purpose body) for handling lumber, tile, brick, etc.

*Write for special literature*

**Wood Hydraulic Hoist & Body Co.**  
Detroit, U. S. A.



# J

**JOHNSON**  
does not refuse!  
to run in 1928!

You will find us ready with a complete line of Bins and Batchers—many of them new models that demonstrate the Johnson policy of not only keeping abreast of the market but somewhat ahead!

The Bins and Batchers we offer you in 1928 are the last word in efficient material-handling equipment. Whether you use a standard type or one built especially to your requirements, you will find Johnson construction superior in workmanship and design, and assuring ease and economy of erection. Users of Johnson Bins find their costs lowered and their profits increased.



Full details sent  
upon request

The speedy, simple operation of Johnson Batchers is well-known. Their construction assures a full discharge, they measure accurately, and meet every requirement of state highway departments.

**C. S. JOHNSON COMPANY**  
CHAMPAIGN ILLINOIS



**BINS & BATCHERS**



# CARR

Machines  
for  
Subgrading

First set your road forms on solid ground.  
**REVOLVING CUTTER** takes the place  
of many picks and shovels on the 10,560  
feet of form trench in each mile of road.

*The Wheel Rolls the Soft Spots*



## TRACTOR PLOWS



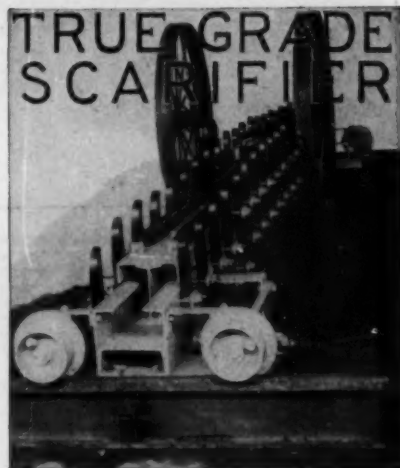
*It's a teurer for its size*

We also make a 7-tooth monster  
that would be a wonderful anchor  
for steamships if the bot-  
tom of the ocean were strong  
enough



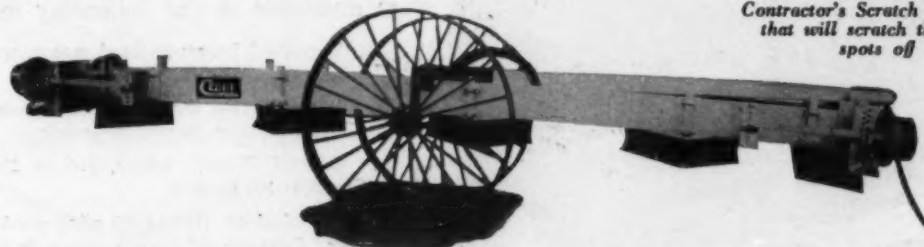
## CLEAN UP BLADE

Automatically saves money  
Engineer's Scratch Templates  
in combination or separate



## A POWERFUL BRUTE for the Hardest Subgrades

Contractor's Scratch Templates  
that will scratch the high  
spots off



## STEEL TRUE-GRADE PLANER

Requires only Half the Power. Cuts half of the  
surface coming, and the other half going.

MR. ENGINEER:—What does a high spot on the subgrade mean ???

MR. CONTRACTOR:—What does a low subgrade cost ???

*Write for the dope*

*If there is no authorized distributor  
in your territory*

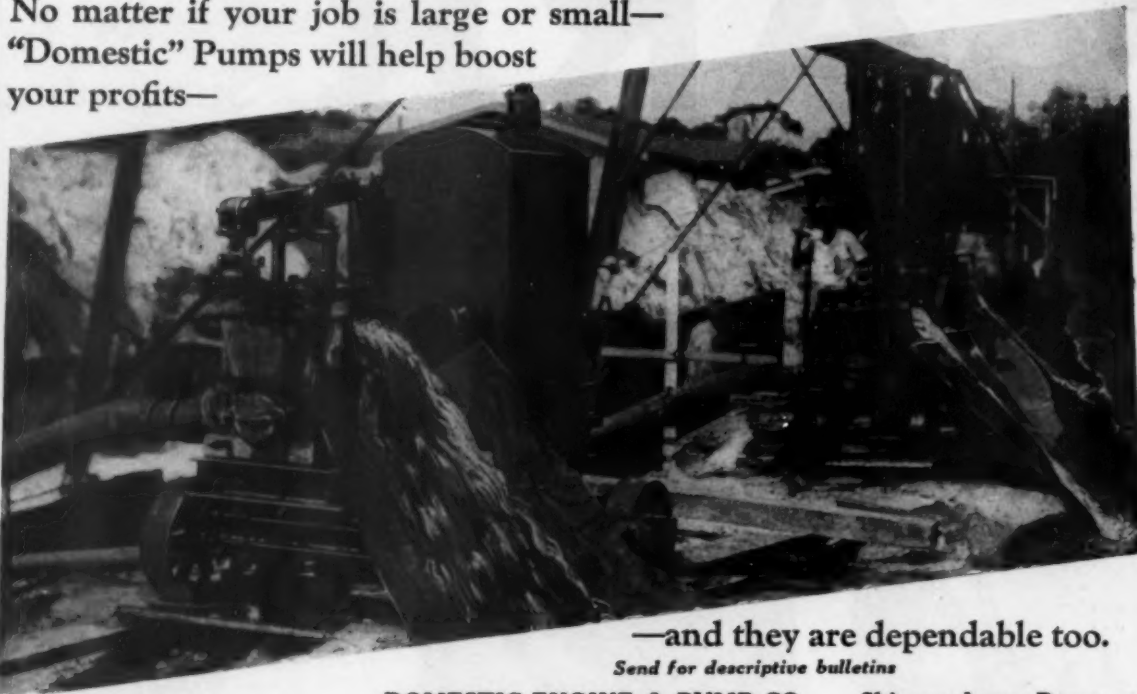
**Ted Carr & Co.**

939 NORTH AV.

CHICAGO, ILL.

# Always in the Lead!—"DOMESTIC" PUMPS

No matter if your job is large or small—  
"Domestic" Pumps will help boost  
your profits—



—and they are dependable too.

Send for descriptive bulletins

DOMESTIC ENGINE & PUMP CO., Shippensburg, Penna.



Now available in the following drives:

- Air— Type "A" Ingersoll-Rand motor, weight 95 pounds.
- A. C.— Westinghouse motor, 110 or 220 volts, 60-cycle, 3-phase, weight 90 pounds.
- D. C.— General Electric motor, 110 or 230 volts, weight 100 pounds.

Above is A. C. Machine cutting 25 piles per-hour, 220 per eight-hour day. Piles are old growth yellow fir 16-in. to 23-in. diameter.

Just a typical example of what this saw will accomplish in the cutting of heavy timber. In use by railroad, marine, mining general construction and other fields.



**REED-PRENTICE CORP.**

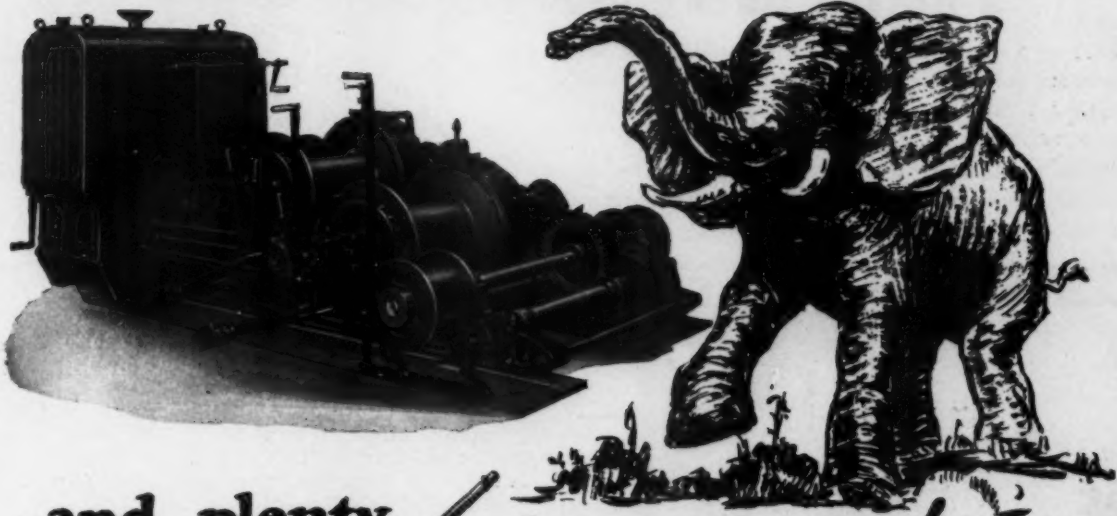
Worcester, Mass.

New York Office

1508 Evening Post Bldg., 75 West St.



# Power to Match Power -



**.and plenty of speed too!**



## *To Equipment Distributors*

The New Patent Three-Speed Hoist is fully protected by patents in the United States and Canada.

Some open exclusive sales territory is now available.

YOU wouldn't go elephant hunting with an air gun. Not if you were seriously intent upon bagging an elephant. In the first place, the leaden pellets would bounce harmlessly off his tough hide. And furthermore an elephant on the offensive is "bad medicine" The quality of the shooting iron is all-important. The elephant gun must have power to match power.

The Mundy Patented Three-Speed Hoist is the "big gun" of its field. It has all the power ever required to get "under the skin" of the toughest kind of hoisting job—with plenty of speed always at hand when speed is required.

The Mundy Hoist is a "repeater"—three shots in its magazine—in other words three speeds, and instant line pull with each one, for

heavy, intermediate and light loads. No reaving changes are ever necessary! Just shift a lever and keep going.

The Mundy has power—more than enough. And its *speed*—for handling light and average loads—means *time and money saved*.

Ask for descriptive bulletin.

## The Mundy Sales Corporation

*Distributors for the J. S. Mundy Hoisting Engine Co*

30 Church St., New York

*Agents in Principal Cities*

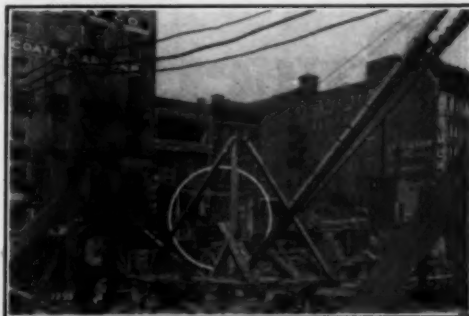
# MUNDY HOISTS

## The Hoist With The Asbestall Frictions

## Foundation work is a good test of a hoist's backbone

Shaking a shower of stones from a blasting mat, with the boom shimmying in time with the signal man's energetic fists—that's one of the many ways foundation work tests a hoist's backbone.

When careful planning and tireless efforts are needed to pick up the other fellow's lost time, remember this experience of a fellow contractor:



"We have eight Lidgerwood rigs now in operation, working as hard as a hoist can be worked. The majority of the hoists are 80 feet; average lift, 3½ tons. My high day's work for one rig has been 70 loads, 3 hoists to the load, in 7½ hours. My average has been better than 40 loads all around.

I have been operating these hoists, some of them close on to three years, and can honestly say that I have not lost one moment through any fault of the machines."

**Lidgerwood Manufacturing  
Company**  
Elizabeth, New Jersey

**Where to buy LIDGERWOOD HOISTS**

**LIDGERWOOD PACIFIC CO.**  
SEATTLE  
TACOMA  
PORTLAND

1. Toronto, Ont.  
2. Canadian Auto Chassis  
3. Baltimore, Md.  
4. E. H. Meyer Co.  
5. Washington, D.C.  
6. E. H. Meyer Co.  
7. Bluefield, W. Va.  
8. Superior Supply Co.  
9. Norfolk, Va.  
10. John D. Wadsworth  
11. Charlotte, N.C.  
12. American Hardware Co.  
13. Atlanta, Ga.  
14. E. S. Armstrong & Bros. Co.  
15. Birmingham, Ala.  
16. Shook & Fletcher  
17. New Orleans, La.  
18. Woodward Wright & Co.  
19. Houston, Tex.  
20. Woodward Wright & Co.  
21. Memphis, Tenn.  
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31. Salt Lake City, Utah  
32. F. C. Richmond Mfg. Co.  
33. San Francisco, Cal.  
34. Burt, S. Smith & Co.  
35. Los Angeles, Cal.  
36. Carlsberg Bros.

CHICAGO  
PITTSBURGH  
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WILKES BARR  
PHILADELPHIA  
ST. LOUIS  
JACKSONVILLE



**BLYSTONE MFG. CO.**  
CAMBRIDGE SPRINGS,  
PENNA.

## THRU A DOOR

You can wheel this new THRU-A-DOOR Blystone Mixer through any 30-inch doorway.

That's the difference between the new and the old Blystone. It's more easily handled and moved from place to place than ever before.

And, just as before, it will give you a more thorough mix than you can possibly get by any other method, work dependably at a high rate of speed, keep twenty-five plasterers busy, and allow the use of 30-40 per cent more sand than when hand-mixing.

If you like to save money on mixing jobs—if you would like to save the daily wages of a laborer—

We suggest that you investigate this thoroughly satisfactory mixer.

For plaster, mortar or concrete

Have you written for a copy of the THRUADOOR circular?

*The Catawba River Bridge in South Carolina is being lastingly protected with Carey Elastite Expansion Joint.*



## PROTECTING the bridge and the engineer's reputation

**T**HE Catawba River Bridge as well as the construction engineer's reputation are being safeguarded by Carey Elastite Expansion Joint. And because it prolongs the life of concrete bridge structures, the use of this material is always endorsed by taxpayers, too.

As you know, Carey Elastite Expansion Joint consists of a heavy body of fibrous asphaltic compound, sandwiched between two substantial layers of asphalt-saturated felt.

It absorbs expansion and contraction,

prevents over-stresses in the structure, protects concrete against breakage and extends its length of service. It will not melt in summer, neither does it become brittle in winter.

Carey Elastite Expansion Joint is made in preformed strips, in widths, lengths and thicknesses as desired, and is as easy to handle as a board.

We'd like to tell you the complete story. Write for particulars about modern methods of Expansion Joint installation.

**Carey Elastite**  
EXPANSION JOINT

**THE PHILIP CAREY COMPANY, Lockland, Cincinnati, Ohio**

Do you mention the CONTRACTORS AND ENGINEERS MONTHLY when writing? Please do.

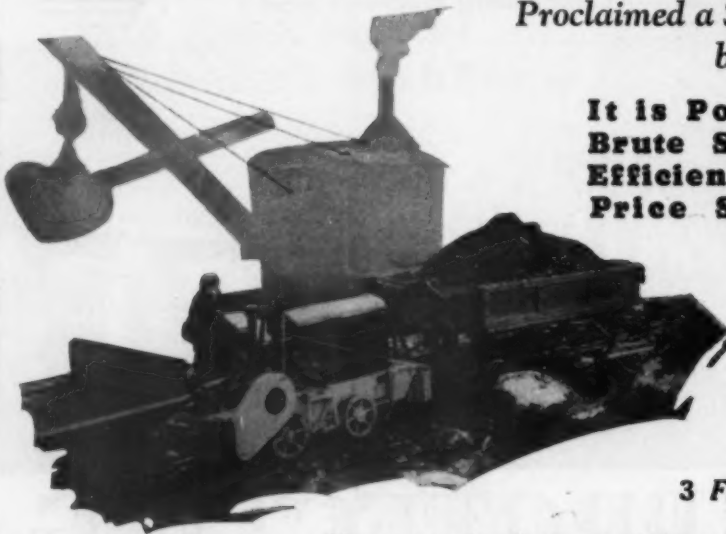


# BROOKVILLE'S LATEST

*Proclaimed a Smashing Hit*

*by Contractors Everywhere!*

**It is Power Personified—  
Brute Strength—Durability—  
Efficiency—Combined at a  
Price Surprisingly Low—**



**Latest -- 4 TON UNIT -- Improved**

*Powered by*

**McCormick-Deering  
Industrial Tractor**

*with*

**3 Forward SPEEDS Reverse 3**

**Glance at a few features of this unit—then write for full details**

**SPEED RANGE:**

2 to 15 miles per hour.

**MAXIMUM TRACTION:**

Guaranteed 2000 pounds drawbar—through special steel-tired drivers.

**SHORT WHEEL BASE:**

Full spring suspension—wide face drivers with deep flange.

*Clings to the rail regardless of how rough or crooked the track may be*

**BROOKVILLE LOCOMOTIVE CO., Brookville, Pa.**

*Prompt and efficient service on replacement parts obtainable from 92 United States International Company-owned branches and thousands of McCormick-Deering Dealers throughout the world*



**Kinney**  
TRADE MARK

## AUTO HEATER & DISTRIBUTOR

**More Miles Have Been Covered by the KINNEY Distributor than by any other heater and distributor in the world.**

**The KINNEY Heater and Distributor**

will properly heat and apply the heaviest asphalts and tars as well as the lighter grades of bituminous road material with equal efficiency and with the least expenditure of time, labor and money.

**Equipped with the Kinney Positive Pressure Pump and the Kinney Spraying Nozzles and circulating and heating systems. Self-loading from tank cars.**

*Write for Booklet*

**KINNEY MANUFACTURING COMPANY**

**BOSTON, MASS.**



Solvay Cured Concrete Road  
Near Effingham, Ill.



Solvay Cured Concrete Road  
Near Trackville, Pa.

# Perfect Concrete Road Curing In Half the Usual Time

Roads can be opened to traffic in half the usual time when they have the great early strength that is so easily obtained through curing with Solvay Calcium Chloride.

The only practical method for curing all types of concrete is presented by Solvay Calcium Chloride. For curing roads it can be spread on the surface or used as an integral part of the mix. It is fast, efficient, dependable; saves time and money.

Solvay Calcium Chloride curing is fast and automatic. No skilled labor is required. The use of a hand spreader makes surface curing a one-man job, and the use of a central mixing device makes integral curing the easiest and most economical kind of concrete curing!

*Full information regarding these subjects  
upon request. Write for Booklet 2051.*




# SOLVAY Calcium Chloride

Flake 77%—80%

Manufactured under United States Patents No. 1,527,121 and No. 1,592,971

## SOLVAY SALES CORPORATION

*Alkalies and Chemical Products Manufactured by  
The Solvay Process Company*

40 Rector Street  New York

## WATER SUPPLY . . . FIRE PROTECTION . . . SEWAGE DISPOSAL



## . . . Easier Quicker Safer . .

**UNIVERSAL CAST IRON PIPE**

No bell holes to dig: No joints to calk

**THE CENTRAL FOUNDRY COMPANY**

Subsidiary of The Universal Pipe and Radiator Company

Graybar Building, 420 Lexington Avenue

Chicago    Birmingham    New York    Dallas    San Francisco

**T**HE TIGHT, FLEXIBLE, DEPENDABLE joints you see here contain no lead nor any other jointing material. All jointing equipment was dispensed with. No bell holes were necessary. Ratchet wrenches were the only tools.

There's nothing to work loose—nothing to deteriorate in a Universal Pipe joint.

The pipe is cast iron. The machined iron-to-iron joint—an integral part of the pipe—is cast iron. Cast iron lasts for centuries.

Easier to handle, quicker to lay and



WATER SUPPLY . . . FIRE PROTECTION . . . SEWAGE DISPOSAL



## .. Nothing to deteriorate ..

safer in service, thousands of miles of Universal Pipe are installed the country over every year—much of it by common labor—for water supply, fire protection, sewage disposal and other service requiring permanently tight lines.

Valves and hydrants of the best known makes are obtainable with the tight Universal Pipe machined joint.

Surely such labor-saving simplicity and unfailing dependability is worthy of your most serious consideration.

Our nearest office is at your service.

### *A Word About Service Boxes*

Have you looked into the Monitor Service Box sponsored by The Central Foundry Company? You'll be delighted with its "stay-on" cover. Interchangeable with your "Buffalo" type box. Ask us to show you how you can escape the risk of broken covers, of lost covers. Address nearest office.

# UNIVERSAL CAST IRON PIPE

No bell holes to dig: No joints to calk

**THE CENTRAL FOUNDRY COMPANY**

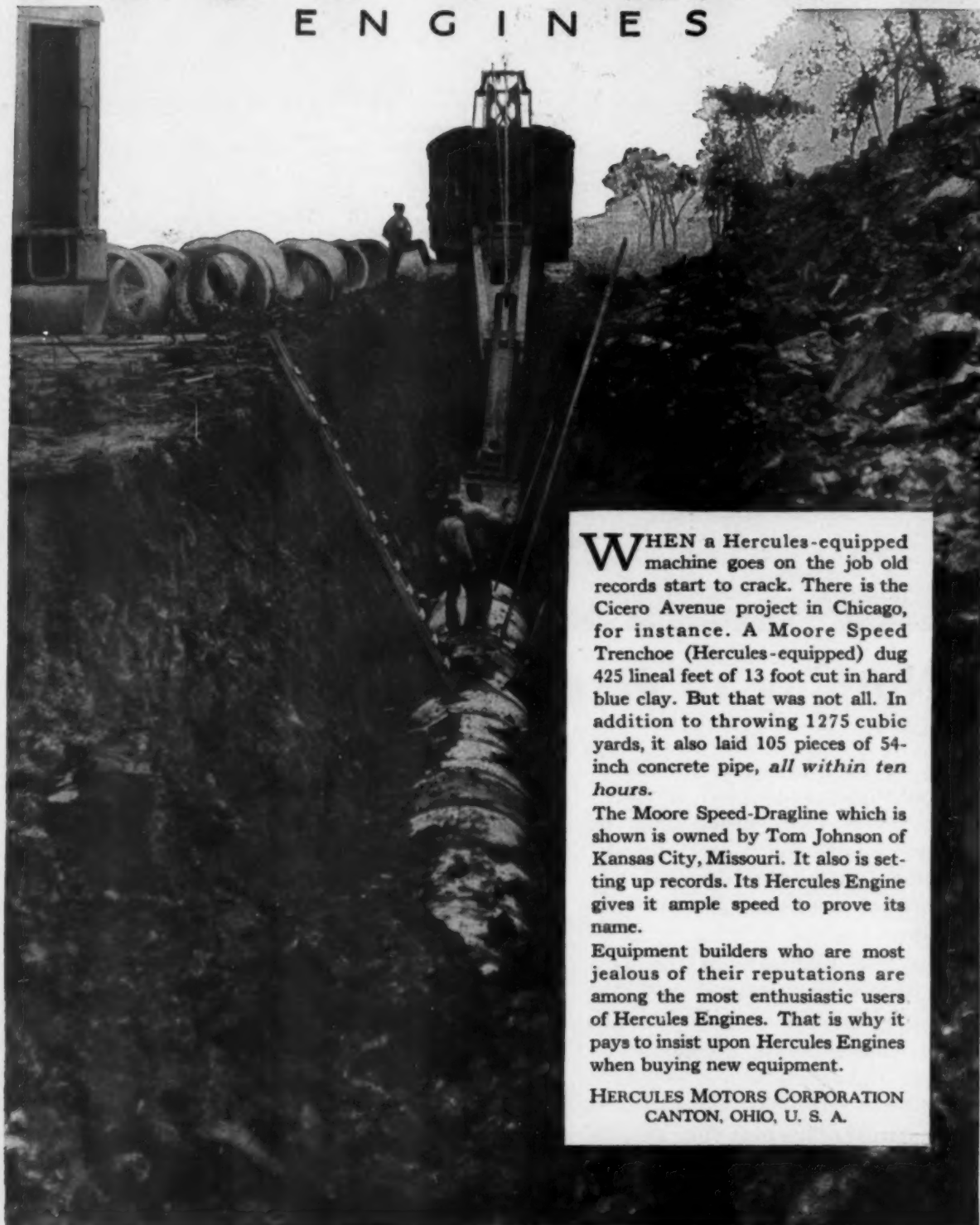
*Subsidiary of The Universal Pipe and Radiator Company*

Graybar Building, 420 Lexington Avenue

Chicago   Birmingham   New York   Dallas   San Francisco

# Hercules

## ENGINES



**W**HEN a Hercules-equipped machine goes on the job old records start to crack. There is the Cicero Avenue project in Chicago, for instance. A Moore Speed Trencher (Hercules-equipped) dug 425 lineal feet of 13 foot cut in hard blue clay. But that was not all. In addition to throwing 1275 cubic yards, it also laid 105 pieces of 54-inch concrete pipe, *all within ten hours.*

The Moore Speed-Dragline which is shown is owned by Tom Johnson of Kansas City, Missouri. It also is setting up records. Its Hercules Engine gives it ample speed to prove its name.

Equipment builders who are most jealous of their reputations are among the most enthusiastic users of Hercules Engines. That is why it pays to insist upon Hercules Engines when buying new equipment.

HERCULES MOTORS CORPORATION  
CANTON, OHIO, U. S. A.

**Aeroil**

## ASPHALT HEATERS



THE NEW AEROIL  
ASPHALT KETTLE  
TRAILER

RUBBER TIRES  
LEAF SPRINGS  
ROLLER BEARINGS

Melts and heats pitch or asphalt in one-half the time required for woodfires. Made in the following sizes: 25-50-65-75-100-110-150-165 gallons capacity. Can also be had on logs and on wheels without rubber tires.

Write for full particulars on type and size to meet your requirements

AEROIL BURNER CO., Inc., West New York, N. J.

Before you Buy or Sell

## STEEL SHEET PILING

Rails, Portable Track,  
Cars, Locomotives, Cranes

Tanks, Hoists, Drag Lines, Pile Hammers  
Oil Engines, a distinct specialty with us

Wire, 'Phone or Write

**ZELNICKER IN ST. LOUIS**

Large Stocks

Efficient Service

Our Bargain Bulletins should be read by **U**



## Save Big Money on Lighting for Night Work

More light for  
less money

Milburn Carbide Lights Operate  
at a Cost of only 3½¢ per hour.

Uses Commercial Carbide or Carbic Cakes.

Contractors who closely investigate operating costs report important savings through the use of the Milburn Light. Patented features, exclusive with the Milburn Light, are responsible for these savings.

Write for information as to the EIGHT POINTS which will help you save money with Milburns.

Ask for booklet No. 223 on "Lights" and 324 on "Welding and Cutting Apparatus."

**THE ALEXANDER MILBURN COMPANY**

1416-1428 W. Baltimore St., Baltimore, Md.

## Hayward Buckets

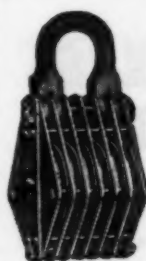


Let Hayward Engineers recommend a bucket to fit the job. The Hayward line includes Clam Shell, Orange Peel, Drag Line and Electric Motor Buckets; Dredging, Excavating and Coal Handling Machinery; Automatic Take-up Reels; Counter-weight Drums.

**THE HAYWARD COMPANY**

32-36 Dey Street,

New York, N. Y.



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• STAR BRAND •

Are Always Reliable

Made for

Every Condition of Service

Sold by

Leading Supply Houses

Let us help you with your problems

**BOSTON & LOCKPORT BLOCK CO.**

NEW YORK

BOSTON

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## NATIONAL Concrete Block Machinery

For Hand Operation  
For Power Operation

Equipment for Every Size Plant  
Highest Production at Lowest Cost

Write us for  
literature and information

**CEMENT BLOCK  
MACHINERY CO.**

Office and Factory

"NATIONAL"  
Power Block Machine

17 Durand St. Newark, N. J.

## Sauerman Power Drag Scraper

Here is a Drag Scraper capable of hauling the toughest digging—and capable of conveying from 30 to 50 loads per hour to the hopper or pile. Sizes range from ¼ to 6 cubic yards, meeting the capacity requirements of every excavating problem.

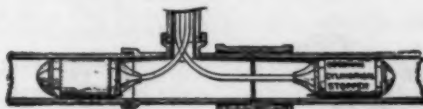
**SAUERMAN BROS., Inc.**

464 So. Clinton St.,  
Chicago, Illinois



## FOR USE IN—

**GAS, OIL, WATER  
AND DRAIN PIPES**



**SAFETY GAS MAIN STOPPER CO.**

523 Atlantic Avenue

BROOKLYN

NEW YORK



## Pay Roll Savers



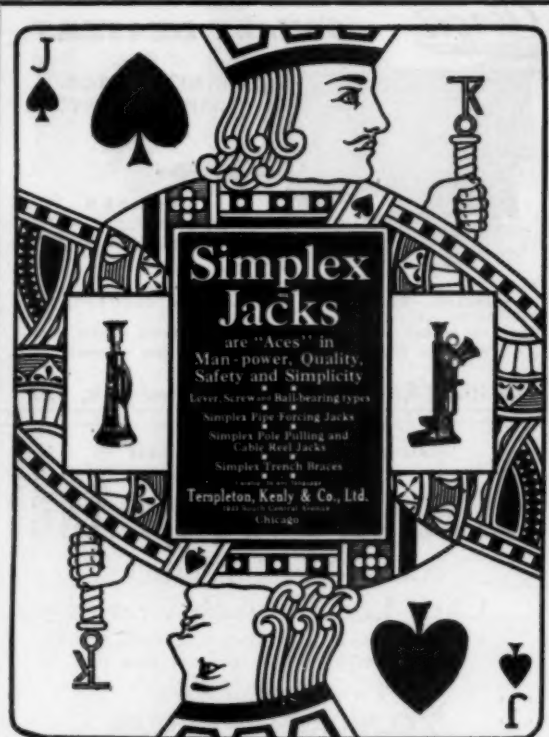
Baker Maney's taking some big loads

### **BAKER MANEY** Self Loading Scrapers

With a pay-roll of only two or three men, you can move as high as 500 to 600 yards a day with a full train of Baker Maney Scrapers. Powerful — easily operated — short turning, they are practical excavators with a long and successful record.

Write for Bulletin No. 251

**THE BAKER MANUFACTURING CO.**  
585 Stanford Ave., Springfield, Ill., U. S. A.



### Simplex Jacks

are "Aces" in  
Man-power, Quality,  
Safety and Simplicity  
Lever, Screw or Ball-bearing types  
Simplex Pipe Forcing Jacks  
Simplex Pole Pulling and  
Cable Reel Jacks  
Simplex Trench Braces

Templeton, Kenly & Co., Ltd.  
1811 South Central Avenue  
Chicago

Ask your contractor's supply house for  
Simplex Trench Braces

## "We Need a New Air Compressor"



"Say, Riley—give me your recommendations for that new compressor by Monday—will you?"

"No need to wait till Monday, Mr. Brown. I can tell you right now why we can't beat Angle Compounds.

"All this talk about efficiencies, controls, and other technical features is all right; but what we want is dependable air power at low cost.

"And cost includes power,

installation, floor space and maintenance."

"But, Riley—how can one compressor beat all the others on every count? That's unusual."

"Sure, it's unusual. So is the Balanced 'Angle Compound' design which saves floor space, and cuts vibration to zero. The first ones, installed more than fifteen years ago, are modern equipment today.

"As for power economy—"

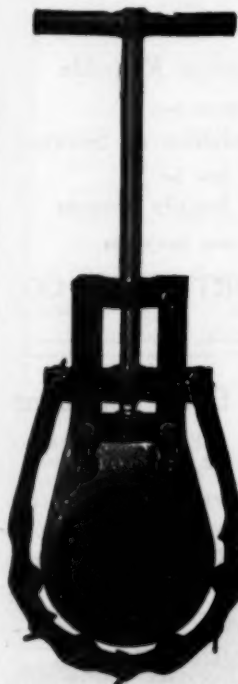
"Never mind that now, Riley; you've got me interested; let's send for that Sullivan Engineer."

To Know Angle Compounds is to Choose Them. Why not send for Catalog 83-A Today?



**SULLIVAN**  
Machinery Company  
162 S. Michigan Ave.  
CHICAGO

## ELLIS PIPE CUTTER



One cut saves the price:

One cut in a ditch partly filled with water—

One cut in a tight corner without disturbing other pipes or street work—

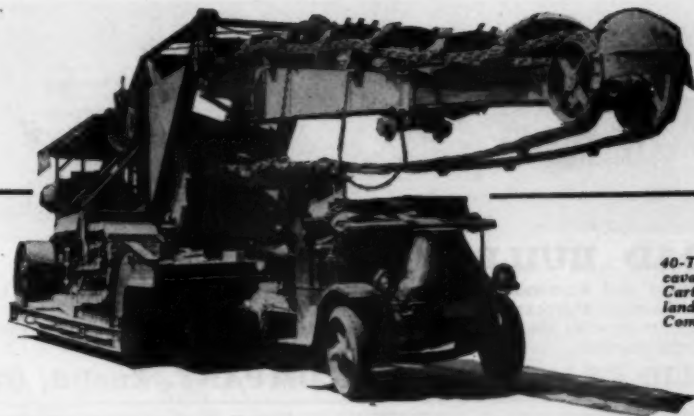
One hurry-up repair job, cutting out a small section of pipe and setting in a new one—

When the emergency arises, you may save the cost of this pipe cutter on ONE job, just as many other contractors and water companies have done.

Made in two sizes:  
No. 01 cuts all kinds of pipe 4-in. to 8-in.  
No. 1 cuts all kinds of pipe 4-in. to 12-in.

Write for circular

**ELLIS & FORD**  
MFG. CO.  
32 Piquette Ave.  
DETROIT, MICH.



40-Ton Buckeye Trench Excavator. Moved by Brown Carriage Company, Cleveland, Ohio, for the Kassoul Company, Cleveland, Ohio.

## A ROGERS WILL GET YOU THERE EVERY TIME

Your job is completed—are you worrying about how you will get your equipment to that new contract 15 or 20 miles away? If so, it will pay you to investigate the ROGERS line of trailers—a size and type for every purpose.

The ROGERS Heavy Duty "Gooseneck Type" shown above is built with 4 rear-wheels-in-line on 2 rocking axles which brings full-bearing surface on the road at all times—insuring longer life to tires and eliminating damage to the road surface. Heavy equipment can be easily and quickly loaded onto a ROGERS trailer and you are assured of a *safe, speedy and economical* trip to the next job. Also, this trailer can carry enormous weights because it is reinforced at every point to insure *maximum strength*.

*Write to us today, if you have a problem*

**ROGERS BROTHERS CORPORATION, Albion, Penna.**

## THE UP-TO-DATENESS OF THE BUFFALO- SPRINGFIELD



*Scarifiers and other special attachments optional*

accounts for the nation-wide preference of street and road builders for this particular make of equipment. That this preference actually does exist all over the country may be verified very quickly by anyone inclined to make a survey of the roller equipment in use in his particular section of the country.

Buffalo-Springfield jobs are designed to meet all sorts of conditions and are built in many models and sizes.

*Illustrated literature ready to mail*

**The BUFFALO-SPRINGFIELD ROLLER CO.,**

**Springfield, Ohio**



## ROAD BUILDING WITH EUCLIDS

They move earth quickly and economically. Euclid wheelers are built to withstand the most severe strains imposed by the heaviest tractors. Write for complete information on the Euclid line of heavy-duty wheel scrapers, rotary fresnos and all-steel tractor-drawn dump wagons.

**THE EUCLID CRANE & HOIST COMPANY, Euclid, Ohio**

Simple:—  
Only nine parts,  
besides braces  
and bolts.  
Weight, with  
Clevis, 350  
pounds

For full description  
get our booklet

*The*  
**WIARD PLOW CO.**

## WIARD'S "2 in 1" SUPER-PLOW

A Dependable  
Road or Contractor's  
Plow

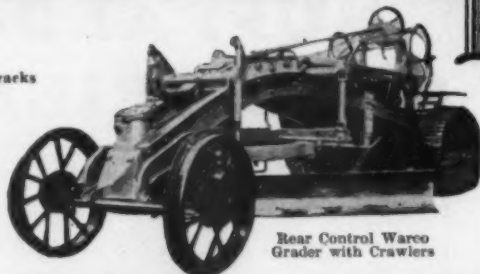


For use with:—  
Animal Power  
Traction Engine  
Road Roller  
Dragline  
or  
other  
power

**Batavia, N. Y.**

# WARCO

Graders  
Scrapers  
Rollers  
Crawler Tracks  
Snow  
Plows



Rear Control Warco  
Grader with Crawlers

**ONE  
MAN  
GRADER**

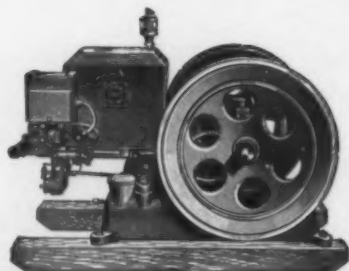
WARCO "One Man" Graders  
have many superior features  
which make them worth more,  
earn more, do more.

Built in Center and Rear Con-  
trol. Crawler Tracks or Rubber  
Wheels.

**W. A. RIDDELL CO.**  
**BUCYRUS, OHIO**

Successors to  
Hadfield-Penfield Steel Co.

# STOVER ENGINES



## Most Dependable Power for Industrial Machinery

Power that is both dependable and economical is vital to the satisfactory operation of industrial machinery, all contractors agree. That's why more and more manufacturers specify Stover Good Engines—because of their proved superiority. 2-hp. size pictured at left. All sizes Wico-magneto-equipped.

## 35 Years of Engine Building Experience

For almost half a century Stover engines have been famous for their in-built quality. Users testify they are better today than ever before. Service stations located everywhere. Write us for FREE literature describing the full line.

**STOVER MFG. & ENGINE CO.**

15 Lake Street  
**FREEPORT, ILL.**

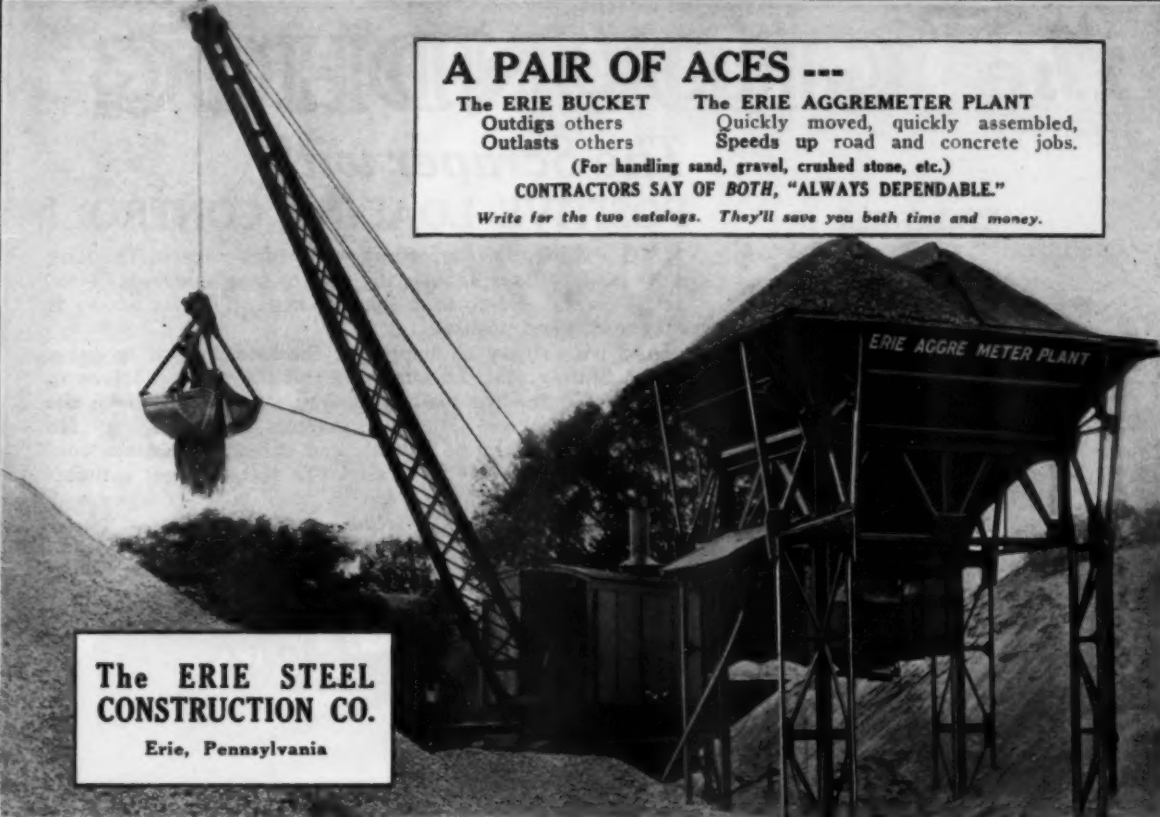


## A PAIR OF ACES ---

**The ERIE BUCKET**  
Outdigs others  
Outlasts others

**The ERIE AGGREGATE PLANT**  
Quickly moved, quickly assembled,  
Speeds up road and concrete jobs.  
(For handling sand, gravel, crushed stone, etc.)

**CONTRACTORS SAY OF BOTH, "ALWAYS DEPENDABLE."**  
*Write for the two catalogs. They'll save you both time and money.*



**The ERIE STEEL  
CONSTRUCTION CO.**  
Erie, Pennsylvania




## DIXON'S WATERPROOF GRAPHITE GREASE

The graphite is the vital element, for it imparts to bearing surfaces a remarkable smoothness that relieves the grease of a very considerable portion of its task of keeping metallic bearing surfaces apart and takes upon itself the wear which would be borne by the metal. The flake graphite increases both the efficiency and endurance of the lubricant.

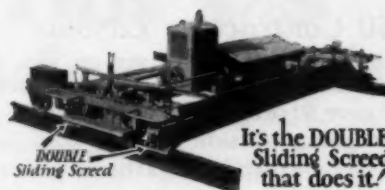
Dixon's Waterproof Graphite Grease is of dense consistency, suitable for general heavy service with slow speeds and heavy pressures.

It possesses a remarkable adhesiveness and cannot be washed off, even by running water, sea water, or alkaline and sulphuric mine water. It cannot gum or become rancid. As a rust preventive it is unsurpassed.

*Write for Circular 148-W*

**JOSEPH DIXON CRUCIBLE CO.**  
Jersey City  New Jersey

## Why Use Wet Concrete When the ORD Will Take It Dry?



*It's the DOUBLE  
Sliding Screenshot  
that does it!*

When you speak of dry concrete finished with the ORD Concrete Road Finisher you speak of a road of high quality. Using a 1-inch slump (five gallons of water to each bag of cement) you can turn out a road that has a crushing strength of 4,000 pounds. For more information, get in touch with us today.

**A. W. French & Co.**

*Manufacturers of the ORD Concrete Road Finisher*

8440 Lowe Ave.

Chicago, Ill.

# The "GROUNDHOG"

Made in 4- and 5-foot widths, capacities 3/5 yard to 1 yard

For use with  
Cietrac "K"  
Fordson  
Caterpillar  
(2-ton)  
McCormick-  
Deering  
etc.



## The Scraper with POSITIVE LOADING CONTROL!

**N**O stalling, no overloading with this scraper. The long loading lever enables the user to take as deep a "bite" as he wants, and to stop loading instantly. Its action is easy, quick and positive.

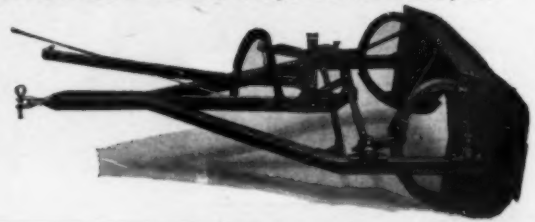
And it's as easy to dispose of the load as it is to get a load. Simply pull the trip rope and the bowl revolves to spread or dump the load as desired. Another pull on the rope, and the bowl returns to loading position again. No stopping, no backing; it loads and spreads or dumps continuously under forward draft. The fastest, most satisfactory scraper you ever used!

Write for full information and  
name of nearest distributor

THE RODERICK LEAN CO., MANSFIELD, O.

Left:  
The load can  
be carried  
any distance

Right:  
Spreading  
position



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Name .....

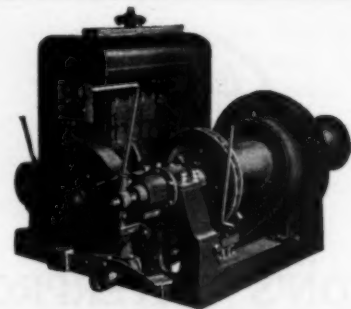
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Representatives in Fifty Cities  
**BARBER-GREENE**  
Portable Belt Conveyors Self-Feeding Bucket Loaders  
Coal Loaders . . . Automatic Ditch Diggers . Coal Feeders



### Do You Insure Your Hoists Against Wear?

It's a good policy to look for, and insist on Timken Tapered Roller Bearings on the drum and intermediate shafts. The tapered roller bearings overcome wear from side-thrust and shock just as well as from friction and radial load. There is always side-thrust in winding the cable on a hoist drum—more so if the lead is at an angle.

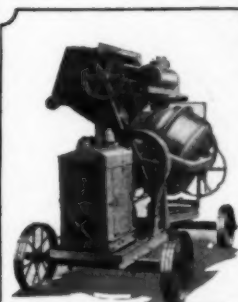
### DAKE Type "20-LG" Hoists

are equipped with Timken Tapered Roller Bearings, Alemite Lubrication, Model "P 20" Continental 4-cylinder Engine, Cumberland Ground Steel Shafts and many other special features which add to the durability, power and convenience.

Write for Bulletin and Prices

**DAKE ENGINE COMPANY**  
Grand Haven, Michigan

# **SPEED** and **ENDURANCE** *At a Low price*



Wonder Tilting Loaders built in 5-7-10-14 cubic feet capacities.



Wonder Non-Tilt Loaders built in 7-10-14 cubic feet capacities.



## **This 3 1/2 S Wonder Mixer**

**G**IVES the contractor a speedy, durable and reliable trailer outfit for the 1/2-bag mixing job. It will help you pour more sidewalks, driveways, house foundations, curbs and gutters, and other small and scattered jobs better and faster—more jobs with more profit per job.

This 3 1/2-S Wonder Tilting Mixer has all those improved and exclusive features that have made Wonder Mixers always the leaders wherever speed on the job and endurance under long service are required.

There is the Wonder Figure-8 Mixing Action—sturdy Mixing Drum on ball-bearings, guaranteed for the life of the mixer—Bronze-bushed Drive Shaft—Convenient Hose Connection—Quick and Easy Tilting Action—Discharge from either side—Spring-cushion Frame—Real Dependable Power Plant—Roller-bearing Wheels—Alemite Lubrication.

All of this you get—backed by Wonder Mixer reputation—along with the economy of LOW PRICE. Send the Coupon now for detailed specifications and prices of the Wonder Mixer suited to your work.

**Construction Machinery Company**  
**447 Vinton Street**      **Waterloo, Iowa**

*Originators of the Single Opening Tilting Mixer*

The Wonder Catalog of Tilting Mixers describes fully all sizes of Wonder Mixers. You'll find the equipment listed for any kind and size of mixing job.

Construction Mch. Co.,  
Waterloo, Iowa  
I'm certainly interested in  
bigger profits this year. Please  
send me catalog and prices on  
machine checked below.

**Tilting Loader Models**  
—3 1/2-S —5-S —7-S  
—10-S —14-S  
**Non-Tilt Mixers**  
**Tilting Trailers**  
—3-S —3 1/2-S  
—5-S With Auxiliary Hoist  
for plaster.

Name \_\_\_\_\_  
Street \_\_\_\_\_  
City \_\_\_\_\_  
State \_\_\_\_\_



# They're Judging Tractor Values by These

## MONARCH TRACTORS



"50"  
\$3625<sup>00</sup>

FOR SPRINGFIELD, ILL.



"75"  
\$5350<sup>00</sup>

FOR SPRINGFIELD, ILL.



Monarch "50" pulling heavy 10-ft. grader with scarifier attachment in front of blade. Send for descriptive folders that give all details of the Monarch "50" and "75".

**WHEREVER** track-type tractors are used, Monarchs are winning whole-hearted approval. Point by point, tractor buyers are measuring values — and finding that in Monarchs they secure substantial promise of steady service and unusually low maintenance cost. In the Monarch "50" and in the "75", tractor buyers find they can buy more power under all soil conditions at the lowest price per drawbar horse

power. By every test, on tough jobs everywhere, Monarchs are setting new standards of

powerful performance.

Complete lubrication at every essential point—easy accessibility to all parts — quick adjustment of clutches and track tension — unusually high road clearance. These are Monarch features you'll want to know more about. Complete details are given in a new folder. Write for a copy.

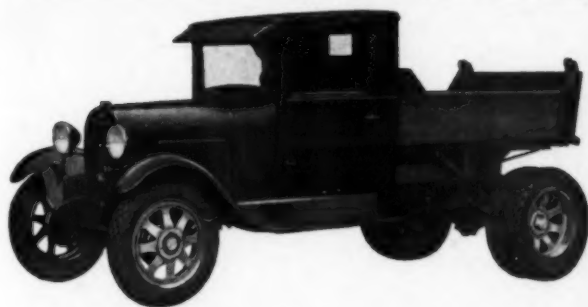
**MONARCH TRACTORS CORPORATION**

Subsidiary of Allis-Chalmers Mfg. Co.  
SPRINGFIELD, ILL.



# Monarch Tractors





## Dual Wheel Equipment for Ford and Chevrolet Trucks

The wide range of hub equipment that we carry enables us to accommodate W & K Websteel Wheels to practically every make of truck, including the Ford—old and new models—and the Chevrolet.

These features of Websteel construction make a particular appeal:

### Great Strength

Forged steel spokes and a design which takes care of the proper distribution of all stresses assure a wheel of tremendous strength.

### Light Weight

The combination of lightness with strength adds to the performance of the truck using Websteels—giving a faster pickup and increased speed.

### Easily Cleaned

The open-spoke construction of the Websteel Wheels and the smooth, rivetless surface allow them to be cleaned, easily and thoroughly, on both sides.

### Increased Tire Mileage

Websteel open-spoke design and construction assure the tires and wheels of proper ventilation. Actual tests show that tire life is increased at least 30 per cent, and brake drums give at least 50 per cent less trouble, where Websteels are used.

*Write for name of our Agent in your territory*



**Whitehead & Kales**  
Detroit Mich & Co



**DIETZ HY-LO**  
HOT BLAST  
*for Contractors*

**D**o you expect your lanterns to stay lighted on the job ALL night?

Then it's not safe to say—"Send me a dozen lanterns!" Better to say—"Send me a dozen DIETZ Lanterns!"

For Dietz Lanterns have a "Balanced Draft" and "All Weather" burning dependability.

A distinguishing feature of HYLO Hot Blast Lantern is the Direct Globe Lift—preferred by many Contractors.

[ For a small additional sum, we stamp the initials of Contracting Firms into the metal of Dietz Lanterns, making them easy to identify. ]

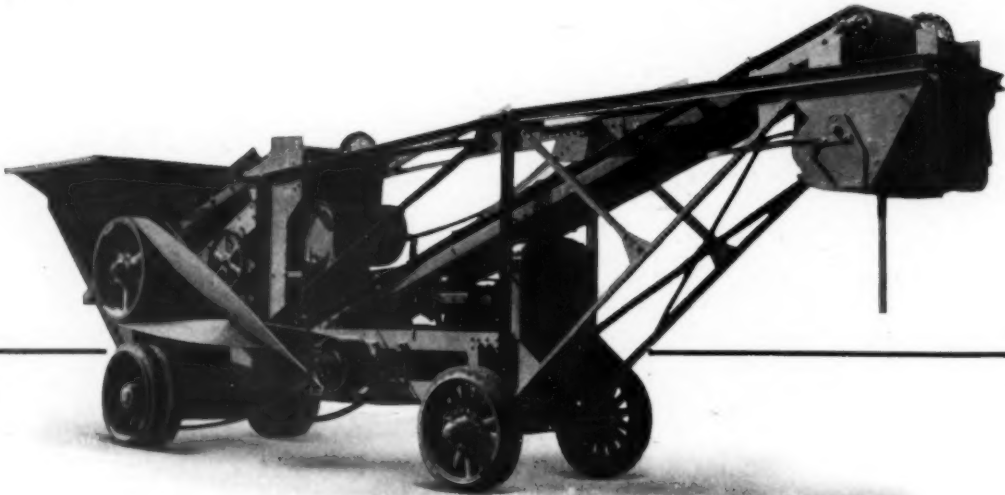
**R. E. DIETZ COMPANY**  
NEW YORK

*Largest Makers of Lanterns in the World*

FOUNDED 1840



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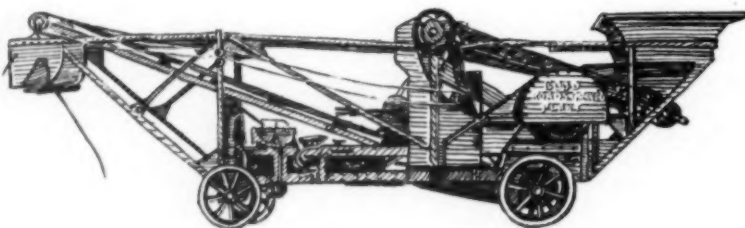


Whether it is to go to work or to move to a new location—

## **The Good Roads Portable Gravel Crushing and Screening Plant**

incorporating the famous Good Roads No. 1030  
Champion Crusher is always "ready to go"!!!

Powered by Waukesha;—Timken-equipped;—and  
Alemite-lubricated.

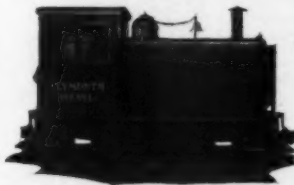


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New  
Bulletin!**

**THE GOOD ROADS MACHINERY CO., Inc.**  
Kennett Square, Pa.



*The*  
**PLYMOUTH**  
LINE OF GASOLINE AND DIESEL  
**LOCOMOTIVES**  
IS COMPLETE FROM  
2 TON TO 50 TON SIZES



The 12-Ton Diesel



If it's a track haulage problem, there's a Plymouth to solve it.

Each size and model a sturdy, rugged, trustworthy power unit—representing that excellence in engineering and design which is typically PLYMOUTH in Locomotives.

The Diesel Locomotive offers the most economical form of power for any haulage problem where the haul is long or the operation continuous throughout a large portion of the day. The Gasoline Locomotive is the most economical haulage unit and effects its greatest saving where operations are more or less intermittent, making the cost of more expensive equipment or the cost of fuel for steam equipment prohibitive.

As builders of both Gasoline and Diesel Locomotives, we are in a position to give you an unbiased recommendation of the type of locomotive best adapted to your needs.

Write for Catalog and Descriptive Literature

**PLYMOUTH LOCOMOTIVE WORKS**

*The Fate-Root-Heath Company*

263 Riggs Avenue

PLYMOUTH, OHIO



KEYSTONE DRILLER CO., BEAVER FALLS, PA.

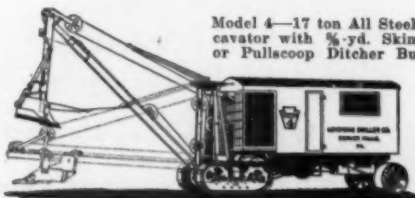
for Road Grading, Trenching, Back-filling, Cellar Digging, Pit Mining, Loading, Unloading and Handling Materials. Crawler-mounted. Steam or electric power if desired.

Saves first cost, moving cost and upkeep, and is readily sold or rented for any sort of excavation job. A reliable road shovel and trenching machine of remarkable adaptability to other uses.

Digs More for a Dollar

**KEYSTONE DRILLER CO.**

BEAVER FALLS, PA.



Model 4—17 ton All Steel Excavator with  $\frac{3}{4}$ -yd. Skimmer or Pullscoop Ditcher Bucket

**A** LIGHT,  
gas drive,  
traction  
shovel, useable  
with 3 different  
interchange-  
able scoops  
—Skimmer,  
Ditcher and  
Clam Shell—

# ALWAYS

*making them  
finer*

—A well finished job—looks a 100%—shows exactly the kind of work that you can always expect and accomplish with—

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**Better Built  
Road Equipment**

Road work's many problems demand many types of machines—each machine especially adapted to the particular kind of work to be done.

Russell is a leader in the enormous road building industry, anticipating growing daily needs and always meeting the demands for greater and more exacting efficiency in every department of road work.

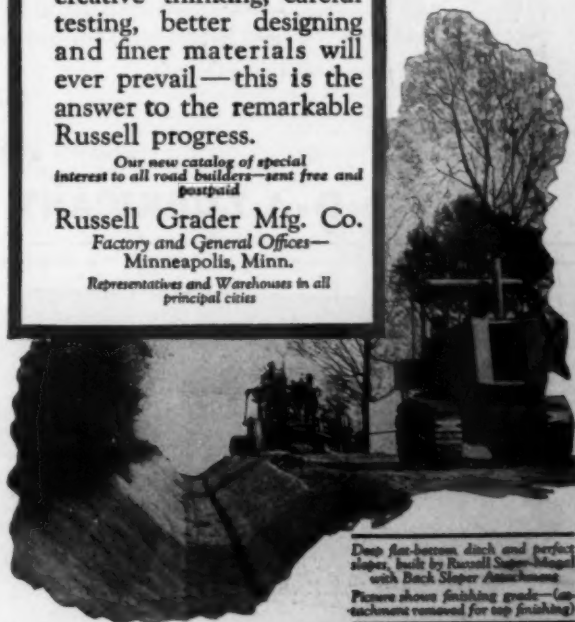
This process of improvement goes steadily on—creative thinking, careful testing, better designing and finer materials will ever prevail—this is the answer to the remarkable Russell progress.

Our new catalog of special interest to all road builders—sent free and postpaid

**Russell Grader Mfg. Co.**

Factory and General Offices—  
Minneapolis, Minn.

Representatives and Warehouses in all principal cities



Deep flat-bottom ditch and perfect slopes, built by Russell Super-Magnum with Back Sloper Attachment. Picture shows finishing grade—(attachments removed for top finishing)

**THE LAST WORD IN ROAD MACHINE CONSTRUCTION**



Built to  
"MAKE MONEY"  
for you

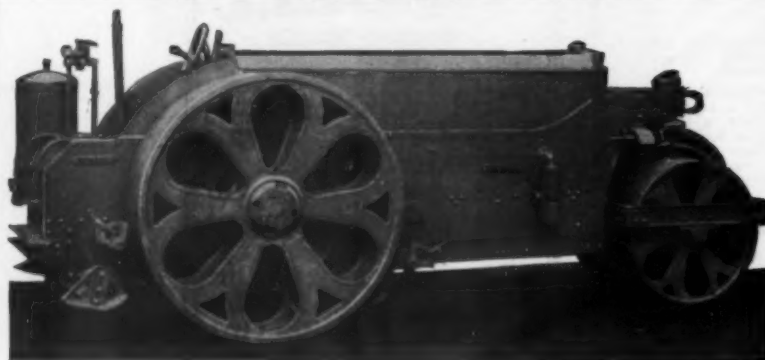
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## FOUR YARDS ROUNDED LOAD

Turn in Its Own Length—Low Center of Gravity  
The Miami All-Steel trailer is built for medium-sized tractors for operation under steam shovels. It can be dumped from the tractor driver's seat, eliminating a man on each trailer. Bottom doors can be opened any width to full opening for spreading when required. High rear wheels give low center of gravity for operation on side hills. The top of the body is but 20½ inches above the top of rear wheels and but 64½ inches from ground. Doors have 8- to 9-inch clearance off the ground, getting away from dumped load quickly. Timken-Bearing-equipped throughout, providing fully against end thrust of the wheels. The low initial cost also is important in your daily operating costs of trailer and tractor. Can be used in trains when required. A letter will bring full details.

This Miami Scraper picks up its load, carries it on roller-bearing wheels and dumps wherever wanted. Operated by tractor driver with tractor power through Miami Winch. Pan capacity 1 cubic yard. Write for details.



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Powerful and dependable, quick in action, economical to operate. Made in 4 sizes (5-7-10-12 tons). Send for Huber Motor Roller Catalog.

The Huber Mfg. Co.

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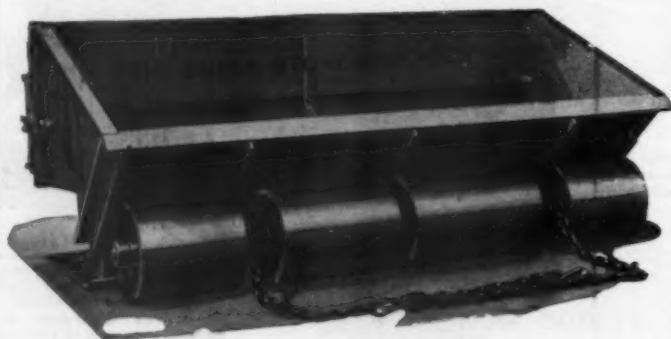
a modern lubricant for modern equipment

D-A replaces cup greases and heavy gear compounds. You'll get better and longer service out of your heavy duty equipment by using it.

Sold thruout the World

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Write today—for our new catalog

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Car Unloader,  
Conveyor or  
Stone Spreader  
for every job.

Why not get yours NOW?

The BURCH CORPORATION

Crestline, Ohio

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## CLAM SHELL BUCKETS



The only clamshell bucket on the market operated on the double lever arm principle.

Guaranteed to give longer service than any other bucket on the market.

Simple and positive in operation.

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**JOS. F. KIESLER COMPANY**

936 West Huron St.

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Buckets of special manganese steel  
—heavy drop-forged bucket chain—  
deeply case-hardened steel pins—  
bucket teeth of chrome vanadium steel  
—four vital features that make the digging end of the Parsons 40 powerful enough to dig through the toughest jobs at a profit.

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# PARSONS

**TRENCH EXCAVATING MACHINERY**

*Handles more dirt per dollar*

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The only compressor on the market with a balanced crankshaft and forced feed oiling system, and with a free running engine clutch which enables the operator to start the engine independent of the compressor (very desirable for starting the engine in cold weather).

Three sizes: 118, 160 and 265 feet of free air piston displacement. Send for catalog.

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O. K. CLUTCH  
AND MACHINERY

# O-K

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PENNSYLVANIA,  
U. S. A.



## Better Concrete Surfacing At Lower Cost

# BERG CONCRETE SURFACER AND FINISHER

The BERG produces better and more finished work in less time and with less labor than any other method. Records from many of the largest concrete jobs in the country show that one man with a BERG can do the work of from four to ten men rubbing by hand.



A One-Man  
Machine

The BERG Concrete Highway Surfer is ideal for surfacing concrete floors. The BERG is also made in the "Regular" Portable Model (Electric and Air Driven) for side-wall and ceiling operation.

THE BERG CONCRETE  
HIGHWAY SURFACER  
Driven by air-cooled gas  
engine

**The Concrete Surfacing Machinery Co.**

*Pioneer Makers for all kinds of  
Concrete Surfacing.*

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Mr. Level-headed Contractor, do you have very much short-haul earth-moving to do—loading, dumping, spreading or leveling? Of course you want to do it in a simple, easy and economical way.

**Schaefer**  
CLEVELAND

## ONE-MAN TRACTOR SCRAPER

*Simple—Safe—Strong*



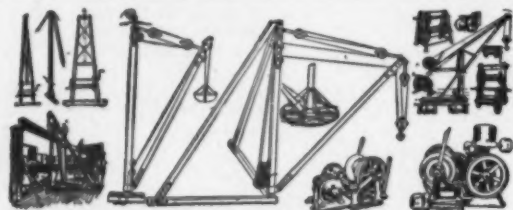
### RETURNING FOR LOAD

The SCHAEFER SCRAPER has been sold the world over since 1921—because contractors recognize a good earth-mover when they see one! Write for YOUR copy of our circular on this economical earth-moving tool.

**The Gustav Schaefer Wagon Co.**

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We have a complete line  
of Derricks and Winches

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*"Built for service"*

ALL STYLES  
Portable and Stationary  
25 to 200 gallons

See our page in Street Construction Section,  
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Write for Pamphlet No. 15 on  
the New Oil Burning Heater

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## Put DOWFLAKE right in the Mixer

Dowflake, added right in the mix in the form of a solution, does away with the extra labor and expense of earth covering, and results in a faster-setting, more uniformly cured slab. It makes concrete more plastic, easier to spread and finish, and reduces the tendency toward surface cleavage, voids and pitting.

Dowflake has been proven practical—it saves time and money.

**THE DOW CHEMICAL COMPANY**  
MIDLAND MICHIGAN

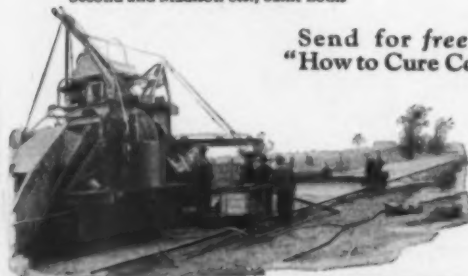
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Dowflake is packed  
in handy water-  
proof 100-lb. bags.

Send for free book  
"How to Cure Concrete."



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It will pay you to look up the UNION line. Write for Bulletin 63, then keep the pages handy for reference by binding them in with the *Associated Equipment Distributors Catalog*.

UNION equipment for construction work also includes Grout Mixers and Ejectors, Cableway Skips, Tunnel Shields, Air Locks, etc. (All described in Bulletin 63.)

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*Write for Descriptive Bulletins.*

**CHICAGO AUTOMATIC CONVEYOR CO.**

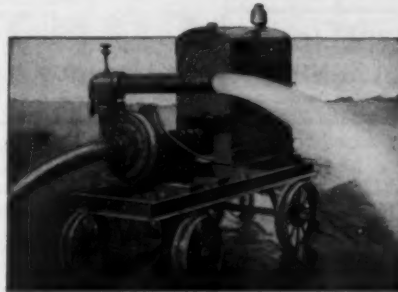
*Originators of the Portable Conveyor*

1853 South 55th Avenue Cicero, Ill.

*Manufacturers of*

Portable and Stationary Belt and Bucket Type Conveyors and Loaders—Shaker Screens

*Agents in all principal cities*



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**Y**ES, this new American-Marsh Centrifugal Pump for drainage work is rugged, light-weight and furnished complete at low price. But it's more than that. It's the only pump automatically primed in a simple, practical way.

Sixty seconds after starting the engine you're handling water—no attention required. And the pump stays primed as long engine runs. Our patented primer is sure-fire—works every time, even in zero weather.

Here's a pumping outfit that saves you plenty. Write for full details today. Suction lifts to 20 ft.; capacities to 72,000 gals. per hour.

AMERICAN STEAM PUMP COMPANY  
BATTLE CREEK, MICHIGAN

## AMERICAN-MARSH

### Type MEP Portable Pumps



## THE TRACTOCRANE

A highly portable unit available with McCormick-Deering or Fordson power unit on rubber-tired wheels, semi- or full-crawler traction.

Attachments include clamshell bucket, backfiller, shovel dipper, skimmer scoop, trench hoe and pile driver.

One-man operation, low initial cost and speed of operation make the TRACTOCRANE a profitable investment.

Guaranteed as to construction and performance.

*Manufactured by*

**THE VERGAN-SCHMIDT CO.**

Dubuque, Iowa



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Contractors and dump truck operators know the superiority of Heil equipment. They like the simple, compact, sturdy design and rapid, trouble-free operation of the Heil Hydro Hoist.

They know it is the only hoist sold under a written two year guarantee. They know also that it cannot be overloaded or overworked as every unit is precision-made and factory-tested.

It means more loads dumped—lower maintenance costs—greater profits. Always specify Heil when ordering dump equipment.

*Write for complete information*

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Milwaukee, Wis.

*Manufacturers of Dump Bodies, Hoists and Trucks*

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PROPER  
CONSTRUCTION

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**CONNEAUT** Hand Shovels  
**JONES-SUPERIOR** Saw Rigs  
**ACME** Rollers and Crushers  
**MUNDY** Hoists  
**DOBBIE** Derricks  
**SCHOFIELD** Excavators  
**CENTURY** Cement Bag Cleaners  
**WILLIAMSPORT** Wire Rope  
**FREEMAN** Truck Turntables  
Dump Wagons and Trailers  
Grader Blades, Tents and Flys  
Wheel and Drag Scrapers  
Grading and Rooter Plows  
**HELYZEL** Road, Sidewalk, Curb and Gutter Forms  
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### Smith-Meadow Supply Company, Inc.

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**LINK-BELT CO.**—Shovels and Cranes  
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"Service That Merits Your Business"

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**Sidney Steel Scraper Co.**—Wheeled, Drag Scrapers, Road Plows, etc.  
**Gerdan Hollow Blast Grate Co.**—Edgers and Trimmers  
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**MONROE** Graders  
**DAYTON** Draglines and Clamshell Machines  
**JOHNSON** Storage Bins  
**METAFORM** Steel Road Rails  
**BUHL** Compressors  
**CLEVELAND & WOOD** Drills  
**REPUBLIC** Concrete Mixers  
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**ORR & SEMBOWER**—Concrete Mixers & Hoists  
**AMERICAN STEEL & WIRE CO.**—"Monitor Wire Rope"  
**LANING COMPANY**—Derricks and Trucks  
**AMERICAN ROLLING MILLS CO.**—"Armed" Ingot Iron  
**WYOMING SHOVEL CO.**—Red Edge Shovels, Scoops  
**LINK-BELT CO.**—Crawler Cranes, Shovels, Loaders  
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 KWIK-MIX—Tilting Concrete Mixers  
 BARBER-GREENE—Loaders, Conveyors, Ditchers  
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 Equipment for Concrete Products Plants, Concrete Mixers,  
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anything in this Directory that is not accurate and up-to-date. Therefore, if you find any errors or corrections we hope you will let us know about them. Thank you.

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DU PONT—Explosives  
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BARBER-GREENE—Ditchers, Loaders, Conveyors  
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MARSH-CAPRON—Mixers  
BAY CITY—Skimmer Scoops, Tractor Shovels  
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BATES—Tractors  
KRESS—Mixer Heaters and Thawers  
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Chain Belt Company, Pavers and Building Mixers  
Barney Pump Company, Contractors' Pumps  
Easton Car & Construction Company, Cars and Truck  
Orr & Sombower, Gas Hoisting Engines, Boilers  
George Hales Mfg. Co., Wagon Loaders and Conveyors  
Heltzel, Road, Sidewalk, Curb and Gutter Forms  
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Climax Engineering Company, Gas Engines  
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M. & M. Form Clamps  
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Ingersoll-Rand Compressors  
Leffel Engines  
Whitcomb Locomotives  
Tel-Smith Crushers  
Barnes Pumps  
Clyde Hoists  
General Wheelbarrows  
Lochen Hercules Cable  
Atlas Shores  
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HAISS Loaders  
PLYMOUTH Gasoline Locomotives  
RED-EDGE Shovels and Picks  
IDEAL Block Machines  
STERLING Wheelbarrows  
GENERAL Excavators  
AMERICAN Wire Rope  
WILLIAMS Buckets  
HOTCHKISS Forms  
GARDNER Air Compressors  
BAY CITY Cranes  
CHICAGO Aut. Conveyors  
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Member: Associated Equipment Distributors

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CONSTRUCTION MACH. CO.—Tilting Drum Mixers  
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KOEHRING—Pavers, Mixers, Cranes, Shovels and Draglines  
LITTLEFORD—Asphalt Removers, Pouring Pots, Paving Tools  
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Complete Line of Road Machinery and Contractors' Equipment

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Barber Greene Loaders & Ditchers  
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 Heltzel Bins and Batches  
 Hayward Clamshell Buckets  
 Archer Concrete Towers and Chuting Plants  
 CMC Gasoline Hoists  
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**IT** Tractors  
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**ATLAS** Mortar & Plaster Mixers, Conveyors  
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**M & M** Form Clamps  
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**Bates Mfg. Co.**—Tractors  
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**Baker Mfg. Co.**—Backfillers, Bull Dozers, Snow Plows and Scrapers  
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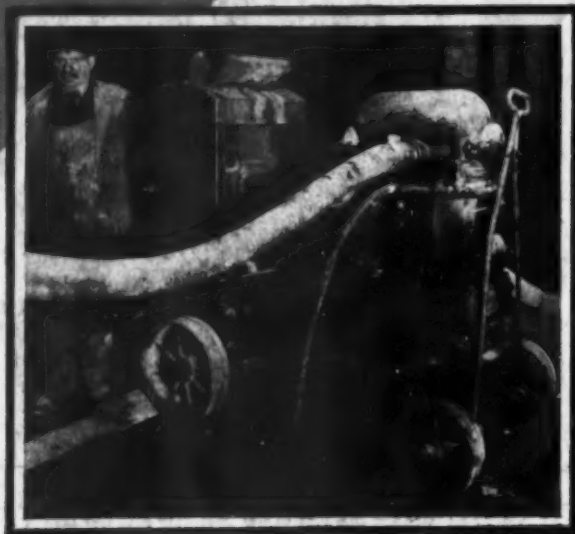
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